STEEL
The Metalworking Weekly
A PENTON PUBLICATION
JUNE 12, 1961

Metal expert George A. Roberts tells how to . . .

Get More from High Speed Steels . . . 140

How to Live with the Government 85

Meet German, U. S. Auto Workers . . . 88

Precision Cast Tool Steels Catch On . . 195

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19

"to help an industry engineer and develop new products and new techniques for the benefit of users is part of our responsibility as a supplier of equipment"

The basic metals industry, like most industries, is always in a stage of development. New ideas and new products must be developed to stay ahead or even abreast. This means hard work, man-hours, and money.

If a supplier is to remain a first source supplier to the industry he serves, he must also be willing and able to supply some of his own man-hours, hard work, and money for the good of the industry from which he derives his business.

We have many projects in our confines at this time on flat rolled, pipe and tube, and cold draw. We are spending our own time, effort, and money to help bring the new ideas and the new products to the surface.

Why shouldn't we? The steel industry and the non-ferrous industry have been good to us in our many years in business.

300 Sixth Ave., Pittsburgh 22, Pennsylvania

Aetna-Standard Division

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Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves

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right in your plant

Steel

for Strength
. . . Economy
. . . Versatility

Even before you place your order, one of our metallurgists will sit down with your engineers to find out what it is you want the wire to do. He'll work with them to determine the right wire for the application—whether you cold-head or coil . . . weave or weld. It's all a part of your Bethlehem order.

And if you're just starting a production run with Bethlehem wire, you can have one of our metallurgical engineers "at your elbow" to advise you. He'll bring his wire experience right into your plant—at no obligation to you. Just call the nearest Bethlehem sales office, or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Get stainless today from these steel service centers:

New steels are born at Armco

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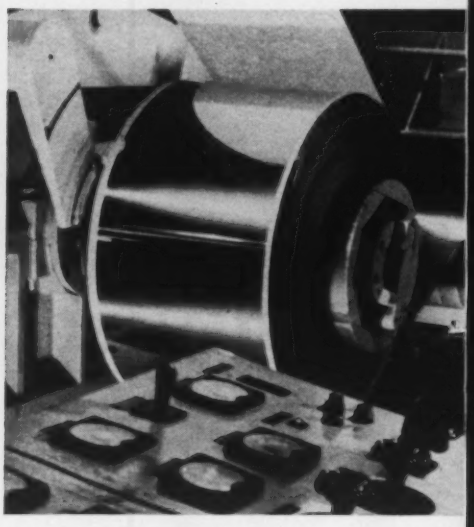
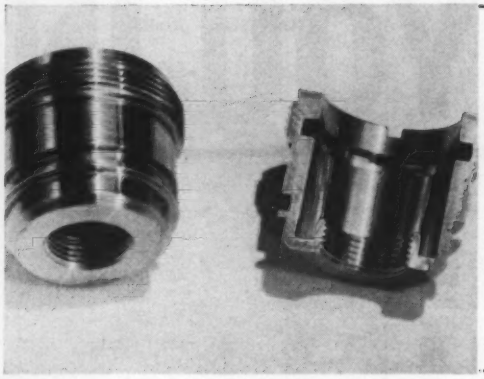


Use this label to identify modern, durable stainless steels in your products.

A C



Armco Division, Armco Steel Corporation
2521 Curtis Street, Middletown, Ohio

PLEASE SEND MORE DATA ON

- ☐ Armco Stainless Steels
- ☐ Bright Annealed Stainless Strip
- ☐ Precipitation Hardening Stainless Steels
- ☐ **Controlled Hardness** 410 and 416 Stainless

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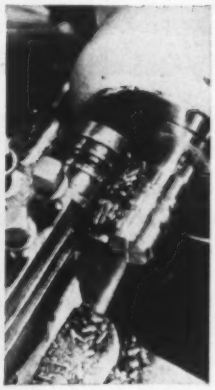
get "up-to-date" Steels



D

B

Bright annealed strip . . . precipitation-hardening stainless . . . close-tolerance sheets . . . controlled hardness bars . . . these are just a few of the special weapons now available in Armco's growing "arsenal" of stainless steels to help *you* fight costs and competition.

Major advantages of these special steels are featured here. Mail the coupon or call your nearest Armco Sales Office or Armco Stainless Steel Distributor for details about these or other Armco Stainless Steels.

A When your tolerances require eyelash-accuracy, Armco's powerful new 50-inch Sendzimir mill is called into action. With the precision of a fine watch, this ultra-modern mill rolls wide stainless steel sheets and coils to close tolerance specifications.

B Since 1955, Armco has supplied automotive trim fabricators with bright annealed stainless steel strip—the first produced in the industry. This fine, decorative finish is available in 12 Armco Stainless grades in widths to 22 inches.

C Armco Precipitation Hardening Stainless Steels are kicking the props from under costs even when they replace alloy steels. The coupling pictured, for example, formerly was made of SAE 4140 steel. Now it's produced from Armco 17-4 PH Stainless bars, with resulting production economies that add up to a **52% cost reduction.**

D Machining headaches caused by hardness variations in Types 410 and 416 stainless can be quickly cured by ordering these grades from Armco to a "Controlled Hardness" range. By a special process, Armco tightens controls on hardness ranges between Rockwell C26 and C38 to produce consistency of hardness superior to standard hardened and tempered 410 and 416.

ARMCO **Armco Division**

IF COMPETITORS MATCH YOU IN PRICE AND QUALITY...

the *LOCTITE* method can give you a double edge

The LOCTITE Method is a bold new approach in metalworking assembly. It reduces rejects, machining time, assembly failure, customer complaints . . . saves on parts and inventory.

Here's what it does: LOCTITE Sealant improves the reliability of press fits and increases their strength—replaces all sizes of lock nuts, screws and washers, jam nuts and interference threads—secures screws and locks studs—seals joints against high-pressure fluids—holds gears, rotors, armatures and fans to shafts.

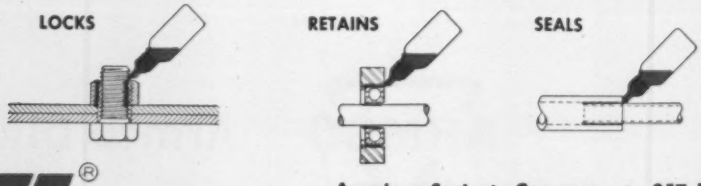
And it does this without a penny invested in equipment. LOCTITE Sealant is simple to use. It can be applied to assembled parts or applied to parts prior to assembly. The plastic container is the applicator. Where desirable, automatic or mass application procedures can easily be set up with "around-the-shop" parts and materials.

What is LOCTITE: LOCTITE Sealant is a penetrating liquid resin that hardens when confined between closely fitted metal parts. It "wicks in" between the most closely mated of matched precision surfaces and hardens into a strong, heat-, oil-, grease-, solvent- and vibration-resistant bond. There are no solvents to evaporate—no catalyst to mix.

Want to reduce costs of your production assemblies? Press fits depend on costly precise tolerances . . . the LOCTITE Method does not. LOCTITE makes a slip fit as strong as a press fit and a press fit still stronger. Thus it can be used to relax tolerances and to improve reliability. Here's one example: An anti-friction bearing with a press fit required 6,000 lbs. to remove it from its housing, while with a slip-fit and the application of a few drops of LOCTITE *it took 8,000 lbs. to remove the same bearing!*

Wherever metals are LOCKED—RETAINED—SEALED in your production assemblies, there is an opportunity to cut costs and realize better profits with the LOCTITE Sealant Method. Details on your application bring immediate response from our Application Engineering Dept. Write today.

LOCTITE GIVES YOU A DOUBLE EDGE—PRODUCTION ASSEMBLY SAVINGS AND GREATER RELIABILITY.



LOCTITE® SEALANT

American Sealants Company • 257 North Mountain Road Hartford 11, Connecticut

The Professor Takes the Stand

Copy Editor Harry Chandler is peering at you through the smoke. Geraldine, our cleaning woman, night editor, and sometime photographer, snapped him in a relaxed moment during a course he is conducting every Friday in June for editors of STEEL and the four other magazines Penton Publishing Co. puts out.

Harry, who also teaches in his spare time at Western Reserve University, is giving all our people a refresher course in business paper writing and editing.

As an ex-marine, Harry is tough about every word that goes into the editorial section of STEEL, including these you are reading now. We wonder how they got by.

How to Write

We often wonder how editors perform a task we find both difficult and fascinating. We have been around observing the species at work and make this report:

Editor Walt Campbell—He closes his office door, turns off the telephone, and hunches over a typewriter. He chews on a cigar (often unlighted) while in the creative throes. Normally, he goes through three of standard length per editorial.

Associate Managing Editor Vance Bell—You can hardly see him behind a mound of statistics, reports, and other data he's boiling for a story on barges, steel distribution, or refractory metals.

Associate Managing Editor John Morgan—He types at a furious pace—smiling, nodding, or frowning at the words like an animated listener to an unseen conversationalist.

News Editor Bill Dean—He's so busy working with other people's copy that we have yet to see him writing his own. But he does—afterhours.

Technical Editor Bob Huber—He's a pacer, striding the corridors with a worried frown. He occasionally darts into his office to type a phrase or two.

Associate Editor George Howick—At his typewriter, he reminds us of Johnny Sellers aboard Carry Back.

Incidental Intelligence

Item: Recognition for the best single ad in the interest of steel service centers during 1960 was given Bethlehem Steel Co. by the Steel Service Center Institute. For the outstanding ad campaign designed to foster understanding of the service centers' role, Jones & Laughlin Steel Corp.'s Stainless & Strip Div. won first place.

Item: *How to Build Job Enthusiasm* is a book just off the presses. As a Dale Carnegie alumnus, we remember one session on that subject. In a nutshell, the word was: "Act enthusiastic, and you'll be enthusiastic."

Author, Author

Thus far, we have received nearly 100 captions for the photo of the hippopotamus we ran May 22.

You will remember that Endevco Corp., Pasadena, Calif., maker of transducers, is sending out a series of direct mail pieces entitled "Life in Space." One was the picture of the hippo, with the caption: "You'll never get ME up in one of those things."

We asked for other captions from our readers, and many good ones came in. Here are samples:

"Hip, Hip Aweigh"—Stan Kosmac, Republic Steel, New York.

"Me, weightless?"—Chuck Hemann, Republic Steel, Cleveland.

"I'm on Metrecal now; what more can I do?"—R. J. Heusel, Flint, Mich.

"You'll never make a monkey out of me"—R. H. Watson, Pittsburgh.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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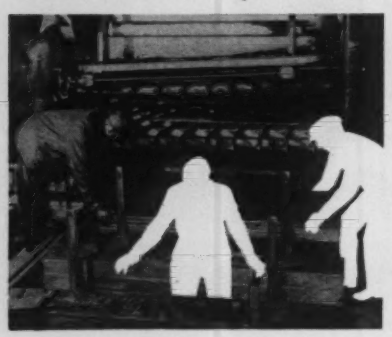


1 man does the work of 3!

CUTS AND STACKS 40% MORE SHEET METAL THAN A SHEAR OPERATOR WORKING WITH 2 HELPERS

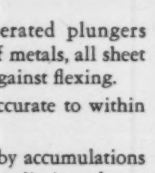
A. R. PURDY CO., metal warehouse, found their operator, working with 2 back-of-shear assistants, could not keep pace with their shear's 60-strokes-a-minute output. Then they installed a FRIED Liftveyor and Stripveyor...

"Production increased to the shear maximum," says a Purdy official. "Equally important, the cost of 2 helpers on each of 3 shears was eliminated!"

Other advantages of the FRIED Liftveyor:

1. Pneumatically operated plungers support all types of metals, all sheet and plate widths, against flexing.
2. Shearing is kept accurate to within .005".
3. Downtime caused by accumulations behind the shear is eliminated.
4. Injuries from sharp-edged cuttings, burrs, falling trim pieces and the like are prevented.

Discover how FRIED plate, sheet and strip handling equipment can help your production and cut your operating costs. For free illustrated catalog, *act now.*



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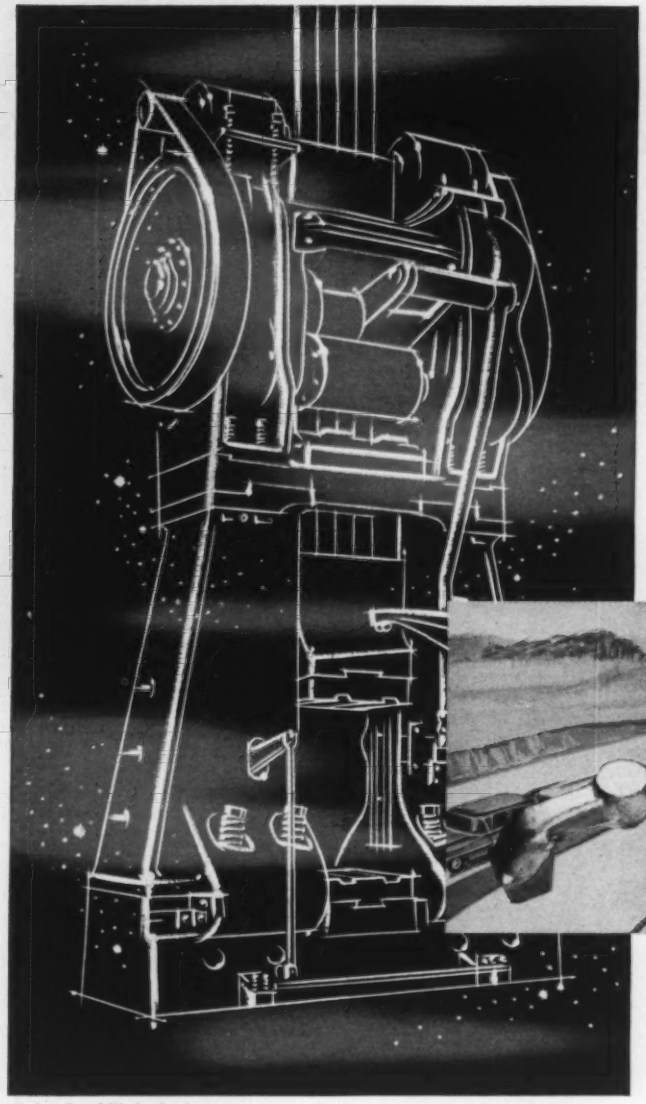
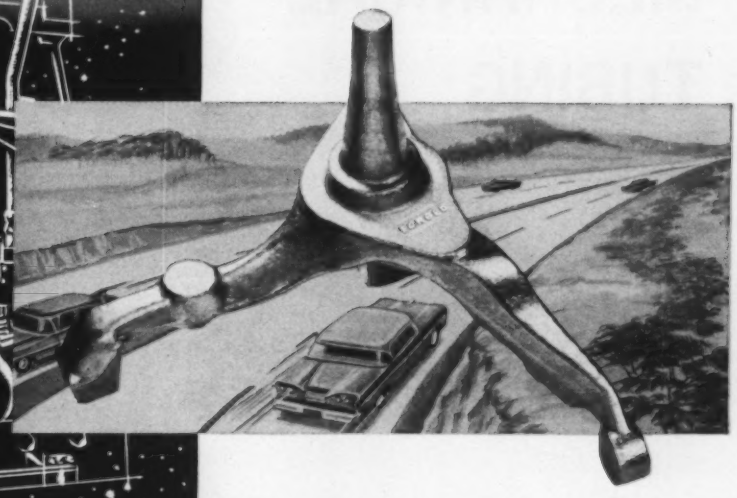


SHOCK-STRENGTH of steering spindle soars by designing it to be forged



Modern board-lift forging hammer

By designing front-end spindles to be forged, automobile and truck manufacturers practically eliminate danger of failure of these vital parts, even under sudden turning stress that can reach thousands of foot-pounds.

Start your designs by planning to use forgings everywhere there's a high degree of stress, vibration, shock, or wear. Forged parts withstand them all better than parts made by other fabrication methods. And forgings have no hidden voids to be uncovered after costly machining hours have been invested . . . the hammer blows or high pressures of the forging process compact the *better* forging metal, make it *even better.*

Write for literature on the design, specification, and procurement of forgings.

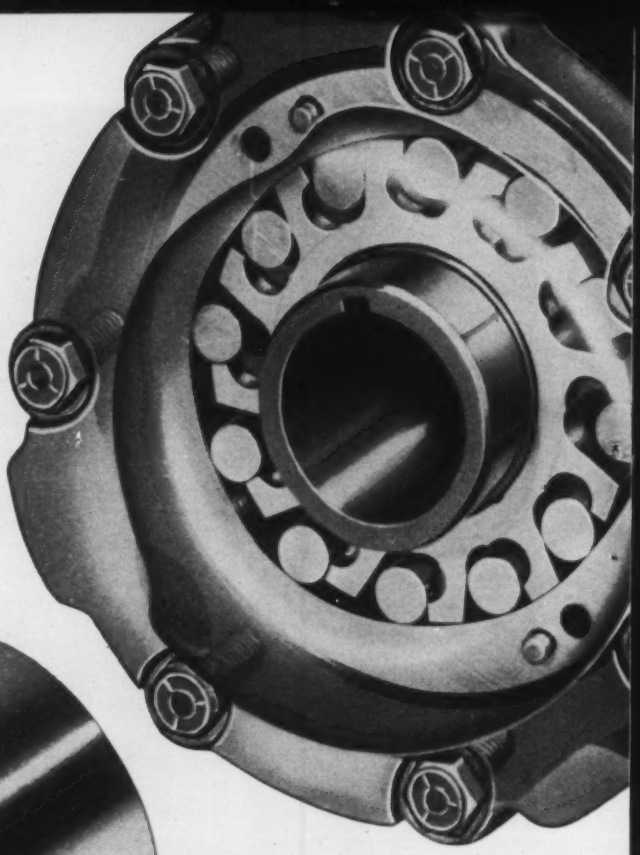
When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine.

Machining greatly reduced by concentricity of

REPUBLIC ELECTRUNITE MECHANICAL TUBING



CRITICAL PART IN POWER STEERING PUMP made with Republic ELECTRUNITE Mechanical Tubing. Keyed bushing fits over engine crankshaft, provides pump drive for power assist. Close tolerance machining is essential for dual mechanical-hydraulic function.

Precise concentricity of ELECTRUNITE Mechanical Tubing solved a machining problem and cut costs for Eaton Manufacturing Company, manufacturers of power steering pumps.

At the heart of the power steering pump is a bushing made from heavy wall ELECTRUNITE which serves as the internal shaft of the unit. It fits on the crankshaft of the car and drives the power steering pump.

The tubing is ground on both the ID and OD. A keyway is broached on the ID the entire length of the part, approximately 2⅝ inches. Another keyway is then milled on the OD.

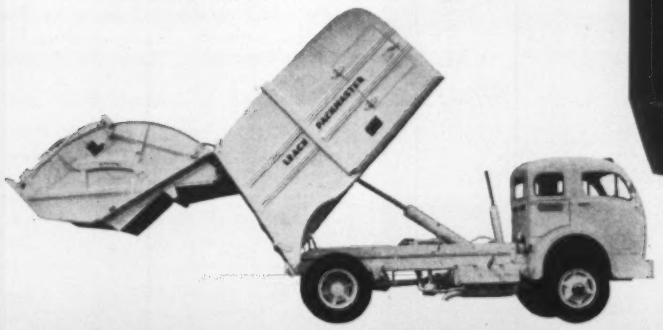
Since Eaton must work to very close tolerances on the part, concentricity of the OD and ID of the tubing are most important to minimize machining.

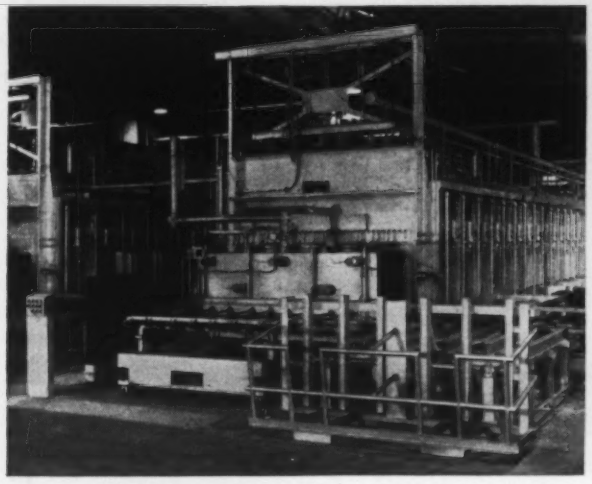
In addition, as it is part of a hydraulic system, the steel must be structurally sound without flaws of any sort.

This is another example of how precision fabricated Republic ELECTRUNITE provides high quality and cost savings for critical applications.

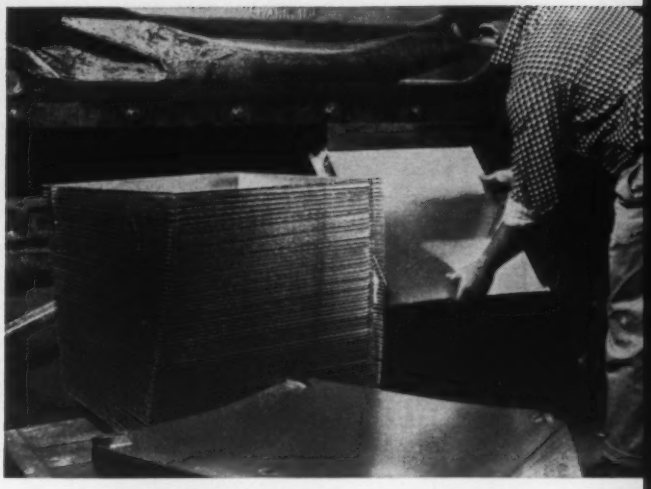
ELECTRUNITE is available in a wide range of sizes, gages, and wall thicknesses in both carbon and stainless steels to meet your needs. For full information call your Republic representative or send coupon below.

COLD FINISHED ALLOY BARS form high strength pins to carry the full weight (up to 5 tons) of this Packmaster body and its refuse load when unit is hoisted to unload. Republic Cold Finished Alloy Bars, cut off, drilled, and chamfered by Leach Company, Oshkosh, Wisconsin, manufacturers of the Packmaster, offer the toughness and abrasion resistance necessary in this application. Investigate the advantages of using Republic Cold Finished Alloy Bars for your component parts production. Mail coupon.





NEW ANNEALING FURNACES provide maximum heat treating capacity for cold extrusion steel. Quality of steel produced at the Chicago Bar Mill attains a high level of uniformity through heat treatment in two new atmosphere-controlled annealing furnaces. These new furnaces provide the capacity to assure prompt delivery of orders for heat treated steels.



BENDING, FLANGING, SEAMING—ductile zinc coating on Republic Galvannealed Sheets stays tight, resists flaking, peeling, or spalling. Hot dip galvanizing plus special heat treatment give Galvannealed a graduated coating of iron—zinc alloys between the pure zinc outer surface and the base metal. The tough, uniform protective finish that is spangle-free provides a good paint base, withstands temperatures to 750°.

REPUBLIC STEEL

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REPUBLIC HAS THE FEEL FOR MODERN STEEL

Strong, Modern, Dependable

Steel

REPUBLIC STEEL CORPORATION
DEPT. ST-2199
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

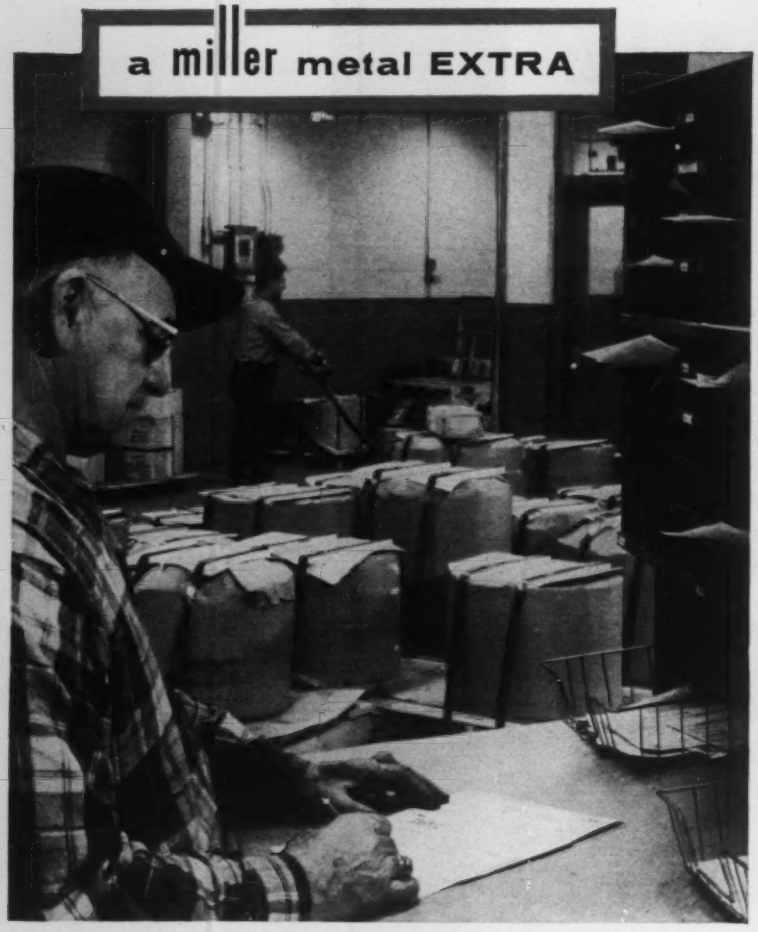
Please send me more information on the following products:
- ☐ Republic ELECTRUNITE® Mechanical Tubing
- ☐ Republic Steel for Cold Extrusions
- ☐ Republic Cold Alloy Bars
- ☐ Republic Galvannealed Sheets

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



prevent downtime, save profits with
DELIVERY YOU CAN COUNT ON

When you order metal, you want it when it's promised. Miller makes sure it's there when you need it . . . by truck, train, or even plane, if necessary. We're proud of our record—98.8% of our promises were kept in 1960, and we'll do even better this year. This personal concern is typical of the service every customer receives from Miller. None of us ever feel we've completed your order until your metal is in your plant, on your machines and satisfactory in every way. Whenever you need brass, bronze, or nickel-silver strip, copper or copper-alloy tube in special shapes and sizes call on the specialists at Miller . . . where you're a name, not just a number on the job ticket.

ROLLING MILL DIVISION
Meriden, Connecticut

miller SINCE 1852

Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut

CALENDAR
OF MEETINGS

June 18-20, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

June 18-23, American Institute of Electrical Engineers: Summer meeting, Cornell University, Ithaca, N. Y. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 19-21, American Marketing Association: Meeting and exhibit, Ambassador Hotel, Los Angeles. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive director: Vance E. Lockhart.

June 19-21, Material Handling Institute: Great Lakes Show, Cobo Hall, Detroit. Information: Shea Expositions Corp., 1 Gateway Center, Pittsburgh 22, Pa. President: L. West Shea.

June 21, Electric Overhead Crane Institute: Meeting, Detroit Athletic Club, Detroit. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: J. H. Peritz.

June 21-24, National Tool, Die & Precision Machining Association: Summer meeting, Schroeder Hotel, Milwaukee. Association's address: 907 Public Square Bldg., Cleveland, Ohio. Executive secretary: Charles R. Bender.

June 22-23, Refractories Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1801 First National Bank Bldg, Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

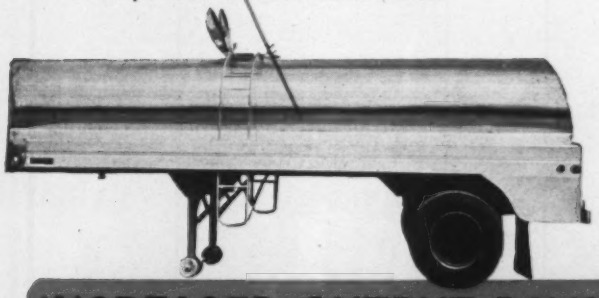
June 22-24, American Foundrymen's Society: Pennsylvania State regional foundry conference, Pennsylvania State University, University Park, Pa. Society's address: Golf & Wolf Roads, Des Plaines, Ill. General manager: W. W. Maloney.

June 25-30, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Thomas A. Marshall Jr.

June 26-27, American Vacuum Society Inc.: Annual conference on vacuum metallurgy, New York University, University Heights Campus, New York. Society's address: Box 1282, Boston 9, Mass. Secretary: Harold C. Weingartner.

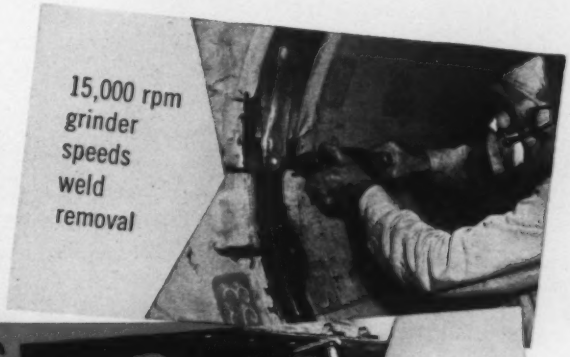
June 28-30, American Society of Mechanical Engineers: Joint automatic control conference, University of Colorado, Boulder, Colo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

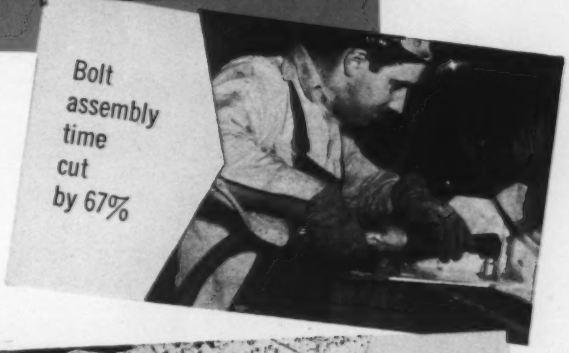
the product milk tank trailer

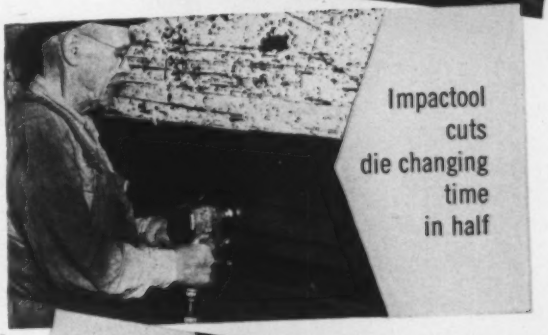


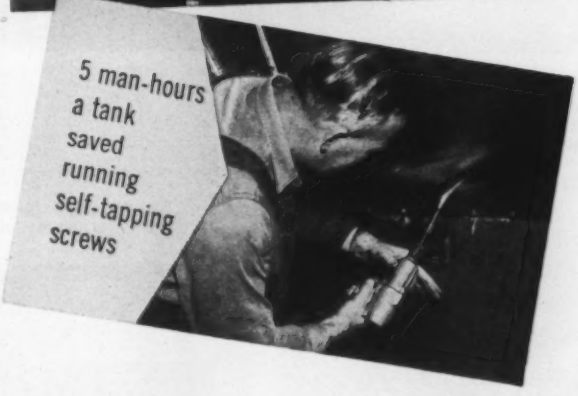
INCREASED OUTPUT PAYS FOR RETOOLING PROGRAM IN 58 DAYS...

NETS $58,000 DIVIDEND/YEAR!









Inefficient and outdated power tools were costing this plant money. A power tool study revealed that in the assembly of tank trucks alone, 29 out of 66 tools were operating at only 40 to 50% efficiency.

New, more efficient Ingersoll-Rand Air Tools with full power and speed replaced the old tools. Fifteen additional I-R tools were installed to cut fabrication time on other operations. Leaks, faulty oilers and air filters were corrected. The net result: increased production that amounted to a $58,000 Dividend on Payroll Dollars the first year.*

With production increases making up the full cost of the tool replacement program in just 58.6 working days, an immediate Planned Annual Retooling program was started to maintain peak tool efficiency and maximum output.

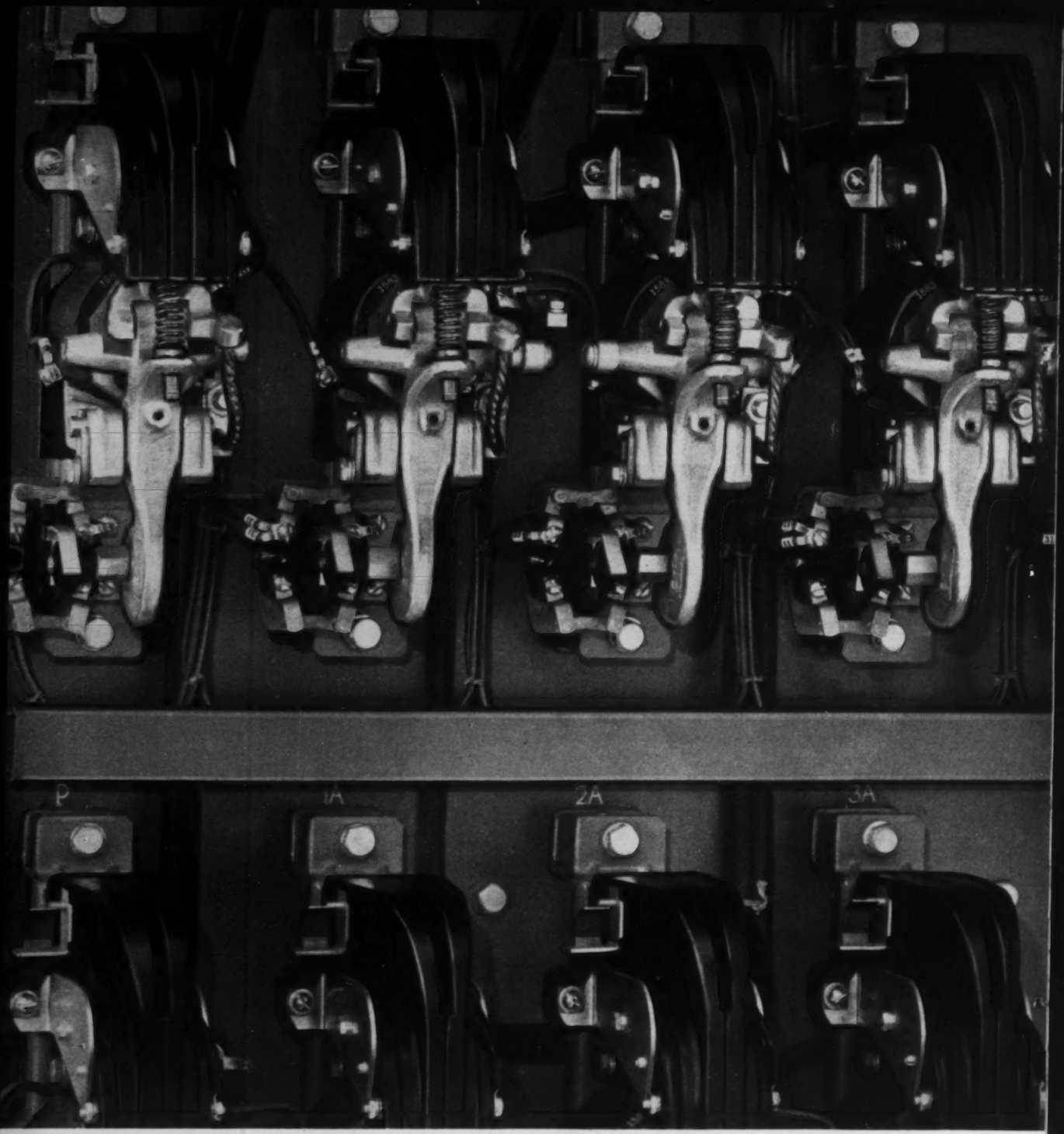
A power tool study in your plant can more than likely show how you can reduce your costs through increased output per man with more efficient tools.

*For details, call your I-R AIRengineer or write Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

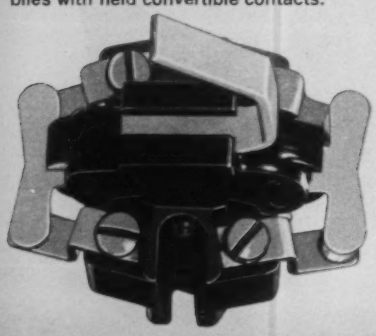
216A-8

Ingersoll-Rand

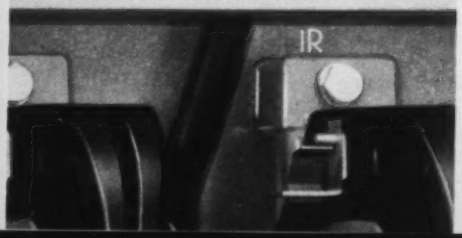
Planned Annual Retooling increases output per man



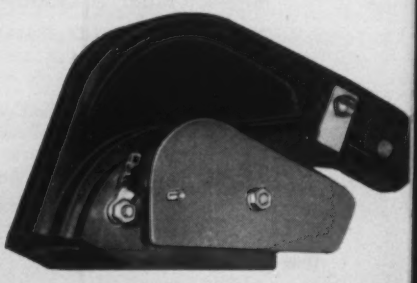
Pre-drilled mounting holes on unit base accommodate electrical interlock assemblies with field convertible contacts.



Bus bar or wiring can go behind elevated contactor. Saves panel space.



New improved arc chute increases contact life.



Now! More compact front wired control panels with new Cutler-Hammer D-c contactors!

Six sizes with new mounting flexibility for the control panel you need: 25, 50, 100, 150, 300, and 600 amperes

Cutler-Hammer's new line of D-c unitized contactors gives you the flexibility of mounting you need . . . in panels built for you by Cutler-Hammer or panels you assemble.

Every contactor is assembled on an insulated steel base, so all that's needed is two bolts to attach it to a steel or slate panel. Wire them from the back or from the front. Surface mount them or elevate them with spacers. Elevated mounting and front wiring give the ultimate in space saving and ease of maintenance.

This rugged new line has been thoroughly tested to give you the typical long-lived performance of all Cutler-Hammer control. Coils are impregnated with epoxy resin for complete protection against moisture and dust. Improved blow-out structure increases contact life even more.

What's new at Cutler-Hammer?
The new line of unitized contactors is just another step to keep Cutler-Hammer your best source for heavy duty mill control equipment. Wherever you look you can see the new spirit—in new, better products, new manufacturing facilities, new engineering talent—all designed to serve you better in the big years ahead. Get all the facts about Cutler-Hammer. Ask your Cutler-Hammer distributor, Cutler-Hammer sales office or write direct for Pub. LO-80-L213 which tells about unitized contactors.

WHAT'S NEW? ASK...

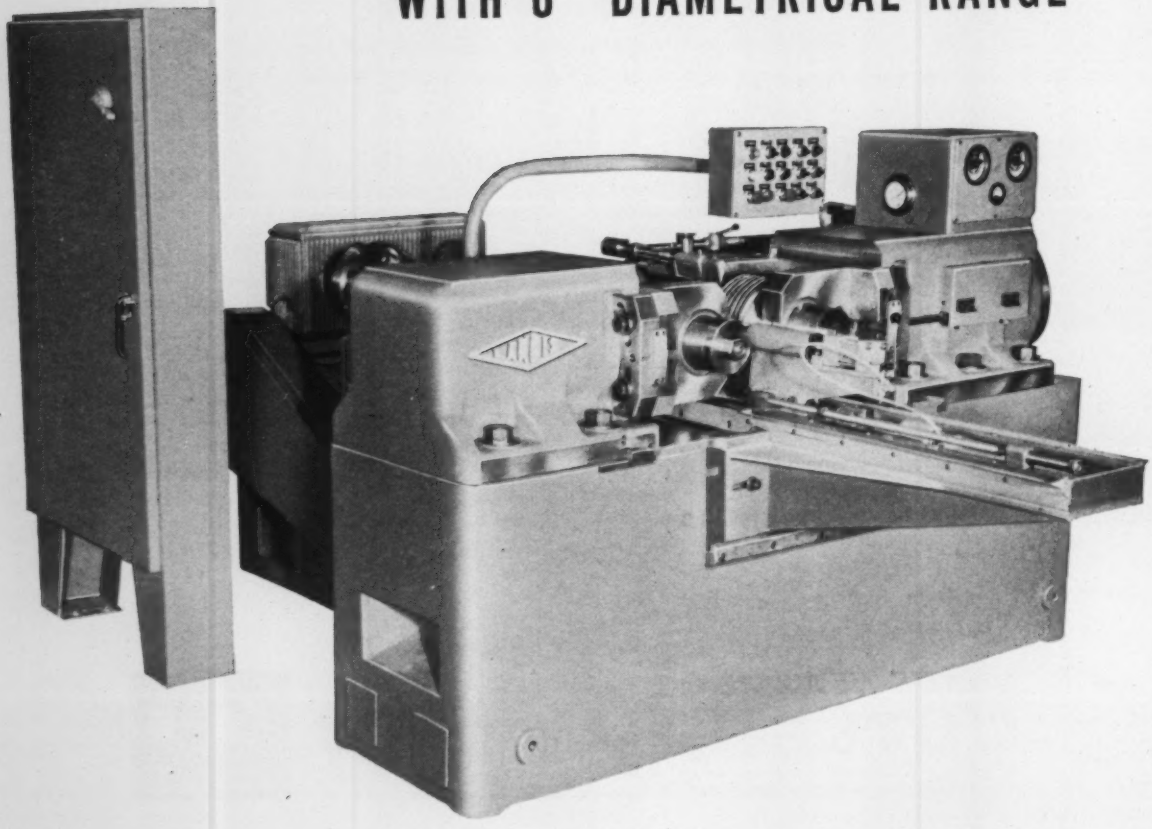
CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

THREAD ROLLING MACHINE

delivers 200,000 pound rolling force

WITH 6" DIAMETRICAL RANGE



NEW

. . . from Landis Machine Company, the world's largest manufacturer of threading equipment, comes the HY-DUTY Thread Rolling and Forming Machine. With an all-steel bed, it is designed for the heaviest thread, form, spline and gear rolling applications . . . even those requiring rolling forces of up to 200,000 pounds.

With hydraulically operated, infinitely regulable and electronically-controlled infeed cycling and variable infeed stroke length, the machine is exceptionally versatile in application. It offers power, rigidity and speed for maximum efficiency within its rated capacity. The HY-DUTY will thread and form up to 6" maximum diameter INFEED, and up to 4" maximum diameter THRUFEED. A full complement of automatic feeding and tooling equipment is available for rolling by either method.

The HY-DUTY Machine complements the medium size LANHYROL and small LAN-NU-ROL Thread Rolling Machines allowing LANDIS to offer a complete line of thread rolling equipment. Whatever your thread rolling requirement, there is a LANDIS machine or tool to do the job. This is the result of over 55 years of experience in the threading field. For additional information about the HY-DUTY Machine, contact your LANDIS Representative (in all leading cities) or write direct for Bulletin E-104.

HY-DUTY FEATURES:

- Manual, semi-automatic and automatic die cycling
- High infeed cycling rates—up to 25 strokes per minute (fully automatic)
- Two die design to minimize set-up time and auxiliary equipment
- 50/25 H.P., 1800/900 R.P.M., motor and 12 spindle speeds ranging from 39 to 476 to provide the power and speed to efficiently roll all diameters within the machine's range
- Maximum thread lengths of 11½" for Infeed rolling, up to 20' Thrufeed
- Roll holders inclinable to 10° in either direction to include the helix angle of any standard AN/UN or Acme thread within the Thrufeed capacity of the machine
- 3" steel plate major bed for maximum mechanical stability
- Worm gear transmission and speed change gear box rated 90% efficient at maximum speed with overload capacity of 100%

LANDIS Machine COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

5100

Can the nation's largest buyer of steel tubing solve a buying problem for you?

If you think of Ryerson as a *supplier* of tubing you're only partly right. Because Ryerson is also a *buyer* of tubing—the nation's largest buyer—and this fact holds important advantages for you.

If your usual requirement can be met from stock, then Ryerson offers you these problem-solving advantages:

1. As the nation's largest buyer of tubing we, of course, have the nation's largest stocks, giving you the widest selection of types and sizes for immediate shipment.
2. In our biggest-buyer relationship with the mills, we have ready access to the knowledge and skill of all the leading producers. So this help is readily available to you through Ryerson, coupled with the practical application experience of our own tubing specialists.

If you are generally a direct mill buyer here's how you gain:

1. At no extra cost you can place mill orders through Ryerson.
2. You deal conveniently with local Ryerson men who take full responsibility for meeting your requirements.
3. As the largest buyer we have a knowledge of sources and position with them that few other buyers can command. You eliminate source searching, paper work, expediting, etc., when you concentrate purchases on one order to Ryerson.

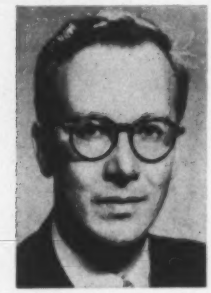
So whatever the size of your requirement, whatever the specification, you can count on Ryerson for fast, dependable delivery. And tight Ryerson controls assure consistent high quality of all shipments. When you need tubing call our nearest plant.

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

White House Starts Steel Study



The Council of Economic Advisers, headed by Walter Heller, has begun a "small scale look" at productivity, labor costs, and profits in the steel industry. The investigation is termed evidence of the "official concern" of the President over the possibility that steel prices might rise this fall. As of now, there aren't any plans to make conclusions public, but White House sources leave few doubts that they will use whatever facts are available as ammunition to hold back "inflationary trends." The steel study would be a "routine" affair, say Council sources, even if they had not heard "rumors" of an impending price hike. The Council is also investigating the construction industry's profit and cost picture. The sources contend that the study is not a sharpshooting expedition but rather a matter of keeping tabs on the economy as the Council is required to do by law.

Steel Prices at Lowest Level in Nearly Three Years

Average prices of finished steel products have dropped to their lowest point since Aug. 5, 1958, the Bureau of Labor Statistics reports. The BLS composite index of mill prices dropped to 185.6 per cent of the 1947-49 average in the week ended May 30 (from 186.0 the week before and 186.2 at the start of 1961). The peak—187—was reached in January, 1959.

A Personal Glimpse at German and American Auto Workers

Friedhelm Meier, left, a Volkswagen worker in Wolfsburg, West Germany, and Nelson Custer, right, a Ford employee in Cleveland, have similar jobs, families, and backgrounds. For a look at how each lives and fares economically, STEEL reporters take you to each of their homes (Pages 88 and 89).

Brown Boveri Counterattacks 'Buy American'

Brown Boveri Corp., U. S. subsidiary of the big Swiss firm with the same name, has launched a promotional counterattack on the "Buy American" theme being pushed by some Americans. Pointing to this nation's $5 billion favorable balance of trade in 1960, BB's president, Paul Sidler, noted: "Too many people are forgetting that trade is a two-way street, and you can't have a high level of exports without accepting some imports." He points out: "If the friendly nations of the Free World, led by the U. S., can't do business together, we are all going to be in a bad position when we are forced to meet real trade pressure from Russia and the other Communist nations." A full

page ad, to be run in seven utility publications, says: "When you don't buy the best machine for the job simply because it's made outside the U. S., you encourage the idea that U. S. manufacturers should rely on protection instead of competition."

Plastic Producers Woo the Home Market

In this B. F. Goodrich Chemical Co. House of Plastics, construction members and garden equipment are made from plastic and plastic coated materials now on the market. The model home was viewed at last week's National Plastics Exposition in New York. Included are such things as plastic wall covering, flooring, shoes, handrails.

Six More Firms Indicted for Price Fixing

A federal grand jury in Milwaukee has indicted six makers of electrical transmission line hardware on a charge of price fixing and other violations of the Sherman Antitrust Act. Cited in the indictment are Hubbard & Co., Chicago; McGraw-Edison Co., Elgin, Ill.; Joslyn Mfg. & Supply Co., Chicago; A. B. Chance Co., Centralia, Mo.; Oliver Electrical Mfg. Co., Battle Creek, Mich.; and Utilities Service Co., Allentown, Pa. The government charges that prices have been "raised, fixed, and maintained at artificially high levels," that "price competition has been restrained, suppressed, and eliminated," and that customers have been "denied the right to receive competitive bids."

How to Make Better Use of High Speed Steels

"Careful balancing of alloying elements and carbon content, together with cobalt additions, will produce high speed steels capable of heat treatment to 70 Rockwell C," says Dr. George A. Roberts, vice president-technology, Vanadium-Alloys Steel Co., Latrobe, Pa., in his article beginning on Page 140. Such hard, tough, tool steels will be used mostly to cut heat treated steels above 50 Rc. For other severe cutting operations, the high vanadium, super-high-speed steels still appear to offer the best answer.

Georgia and Alabama Vie for Steel Mill

Both Alabama and Georgia are trying to land a proposed steel plant which would reportedly be financed by Texas oil and insurance interests. Studies are being made of iron ore reserves in the Eufaula, Ala., and Georgetown, Ga., areas. The plant would reportedly cost around $30 million.

CED Proposes Method to Stop Gold Flow

The Committee for Economic Development is calling for an agreement among the monetary authorities of the major financial countries to stop gold flow. Method: Any country receiving a large inflow of foreign currency would hold

the currency rather than convert it into gold. Such action, says CED, would enable the countries to "withstand a speculative exodus of hot money."

Century 21 Exposition Gets Off the Ground

This maze of reinforcing was nearly complete when welders climbed between layers of steel to put finishing touches on steelwork for the foundation of the Century 21 Exposition's Space Needle, a major attraction at the event to be held next year. In the needle at the 500 ft level will be a restaurant turntable that will make a complete revolution hourly; customers will get a full view of the grounds. Western Gear Corp., Seattle, will make the turntable. Howard S. Wright Construction Co. is the general contractor.

Metalworking Innovates; Papermakers Save Dollars

A new combination wire for Fourdrinier machines will bring major savings to papermakers. One mill reports cost reductions between $14,000 and $30,000 monthly. The wire has a phosphor bronze core; the outer portion is stainless. The composite is made by drawing down a multistrand assembly. Fort Wayne Metals Inc. supplies the wire to W. S. Tyler Co., maker of the Fourdrinier screens.

Union Withdraws Wage Hike Request

The Aircraft Workers Alliance, an independent union representing 6700 workers at three Thompson Ramo Wooldridge Inc. plants, has withdrawn its request for wage increases. The action followed a company plea to forego a hike because of a slump in profits—due to a business decline. The union reserved the right to ask for a hike later if business improves.

How Russia's Production Has Jumped

The National Industrial Conference Board reports these percentage increases in USSR gross production from 1953 through 1960:

Motorcycles*	248%	Tractors	111%
Sewing Machines	212%	Locomotives	85%
Furniture	197%	Passenger Cars	80%
Radio Receivers	152%	Machine Tools	68%
Watches & Clocks	103%	Metallurgical Equipment	43%
Footwear	76%	Trucks & Buses	39%
Bicycles*	72%	Electric Motors*	36%

*Through 1959 only.

How New Equipment Fights Inflation

Sound investment in new equipment is substantially aiding the domestic steel industry to fight inflation and regain its competitive position in world markets. An example comes from Harleston R. Wood, president, Alan Wood Steel Co. New mills are permitting the firm to make plates (from conversion of slabs through shipping) with 85 manhours per 100 tons vs. 240 manhours per 100 tons on the old facilities. The savings will amount to $6

STEEL The Metalworking Weekly

June 12, 1961 Vol. 148 No. 24

CONTENTS

THE EDITOR'S VIEWS:
Domestic Aid 81

WINDOWS OF WASHINGTON:
Small Firms: Bigger Defense Cut .. 92

MIRRORS OF MOTORDOM:
Can Cast Iron Liners Be Dropped? 101

THE BUSINESS TREND:
Fuse Lit for Capital Outlay Boom? 105

NEWS SECTION:
How to Live with the Government . 85
Gearmaker Profits Pinched 87
Meet Nelson Custer: American Auto Worker 88
Meet Friedhelm Meier: German Auto Worker 89
Portable Tool Sales Snap Back ... 90
Race to Moon: $20 Billion Market . 91
West Indies Called Untapped Market 95
Getting Communications on Target .. 96
Depreciation Reform: Little, Late? .. 98
Torrington to Build New Plants .. 115

TECHNICAL SECTION:
Technical Outlook 139
Get More from High Speed Steels . 140
Wheezey-Gheezey Sizes Shells 145
Machine Topics—Five Steps to Optimum Machining 146
Progress in Steelmaking—Small Degasser May Boost Castings Use . 148
Magnesium Adds to Galvanized Life 154
Cost of Plating Waste Disposal Cut 160
Mill Welds Tubing More Efficiently 164

MARKET SECTION:
Market Outlook 193
Complete Index to News and Prices 193
Precision Cast Tool Steels Catch On 195
West Coast Steel Imports Soar 197
Canadian Steel Output Hits Peak .. 199
District Ingot Rates and Chart 202
Scrap Index Rises to Higher Level . 216
Scrapmen Say Ore Rates Subnormal 217
Nonferrous Metals—Market Quieter, But for How Long? ... 220

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 109
New Products 167
New Literature 190
Advertising Index 224

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29 W. 39th St., New York 18, N. Y.

per ton of plates or $7 million annually at 80 per cent of capacity. The mills will also permit the firm to compete for 80 per cent of the tonnage of steel plates in its marketing area vs. 30 per cent with the old facilities.

Appliance Makers Propose Industry Code of Ethics

The Institute of Appliance Manufacturers meeting in Cincinnati last week invited all trade associations representing major appliances to join it in drawing up an industry-wide code of ethics. "For the first time in history, we have the right combination of circumstances, incentives, and resources for total ethical reform," contended Sol Goldin, president of IAM and retail marketing manager for Whirlpool Corp. Ethics is more than legality and honesty, he declared. It extends to such areas as quality control, materials specifications, firing and hiring, sales, pricing, distribution policies, franchising, and new product scheduling.

Industrial Designer Asks Dollars for Development

Walter P. Margulies, president, Lippincott & Margulies Inc., New York industrial design firm, has suggested to President Kennedy that the government co-operate with private industry to develop inexpensive equipment, tools, and appliances for the underdeveloped nations. He called for a government appropriation of $100 million.

Straws in the Wind

Metropolitan Cleveland is well on its way toward another record year in manufacturing and utility expansion. Projects costing about $150 million have been announced since the first of the year, says the Cleveland Chamber of Commerce . . . The Atomic Energy Commission is inviting industry proposals for a portable, nuclear, powerplant for the Byrd Station in the Antarctic . . . The AEC also announced that a nuclear powerplant for the Air Force, built by Martin Co., has been airlifted, in 16 packages, to a Wyoming mountain top . . . A stainless strip producer is set to announce availability of new buffed, highly reflective stainless strip to compete with the bright annealed process.

Metalworking Pulse

The Business Trend: STEEL's industrial production index fell 1(points in the week ended June 3 as the result of the short workweek occasioned by the Memorial Day holiday. **Autos:** Output is scheduled to pick up. Automakers have targeted 542,400 assemblies for June. **Steel:** The national ingot rate declined, due mainly to shutdowns of five open hearths by Bethlehem in the Buffalo district.

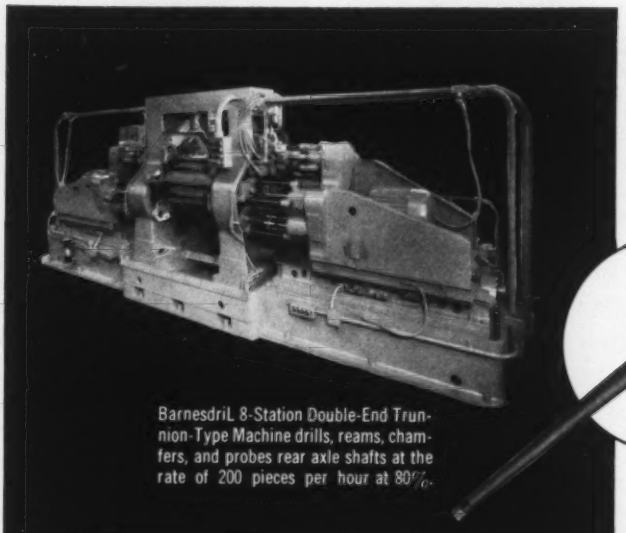
- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended June 3 .... 155†
  Year ago 147
  Details on Page 105

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended June 10 . 130,000*
  Year ago 139,423
  Details on Page 102

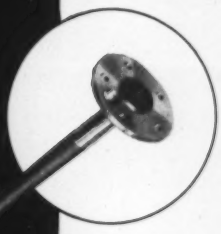
- **STEEL INGOT OUTPUT (TONS)**
  Week ended June 10 2,030,000*
  Week ago 2,052,000
  Details on Page 202

†Preliminary. *Estimated.

AGAIN...and AGAIN...and AGAIN BARNESDRIL ENGINEERS MEET THE CHALLENGE...

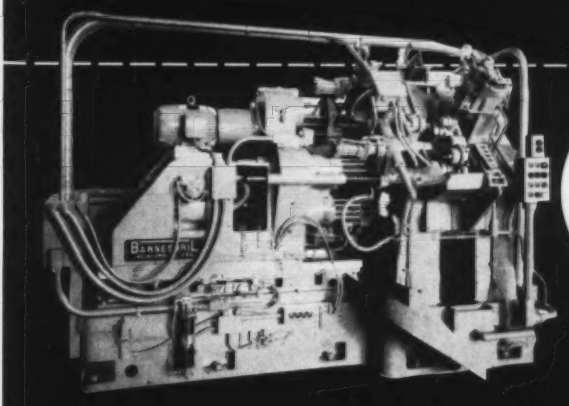


BarnesdriL 8-Station Double-End Trunnion-Type Machine drills, reams, chamfers, and probes rear axle shafts at the rate of 200 pieces per hour at 80%.

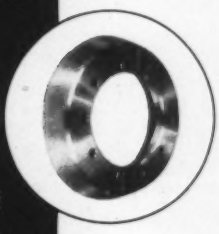


...TO SPEED PRODUCTION OF REAR AXLE SHAFTS

BarnesdriL's design improvement program led to the development of this 8-Station Trunnion-Type Machine. It produces as many rear axle shafts in one 8-hour shift as an older style Rotary Index Machine did in five 8-hour shifts.

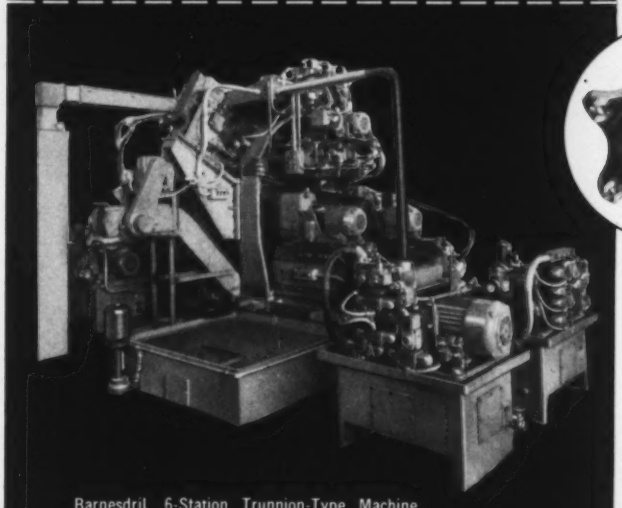


Special 8-Station Drum-Type Machine designed and built by Barnes Drill Co. for drilling, reaming, chamfering, tapping, and probing rear axle drive gears at 200 parts per hour at 80%.



...TO CUT COSTS ON REAR AXLE RING GEARS

This Drum-Type machine is a recent BarnesdriL engineering achievement to substantially increase production of ring gears for a large automobile company. Equally as important as increased production speed is the extreme tolerance accuracy and precision machining incorporated in this unit.



BarnesdriL 6-Station Trunnion-Type Machine performs drilling, threading spindle end, reaming, milling keyway, spot-facing, and probe operations on automotive steering knuckles at 208 pieces per hour at 80%.

...TO IMPROVE OUTPUT ON STEERING KNUCKLES

Another BarnesdriL Trunnion-Type Machine — a 6-Station Unit for machining steering knuckles. Application of a horizontal-type machine achieved more effective chip disposal, increased power through heavier construction, and higher speeds and feeds.

BarnesdriL's experience in designing and building special machinery is at your disposal.

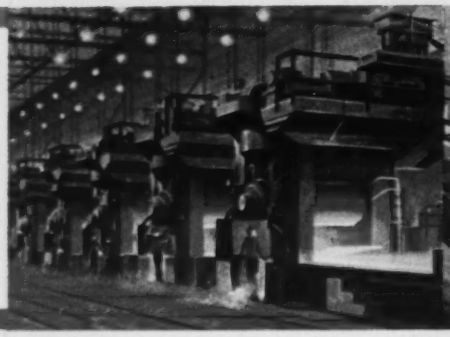
Honing Machines/Production Units
Filtration Units/Drilling Machines

BARNESDRIL
PRODUCTION UNITS

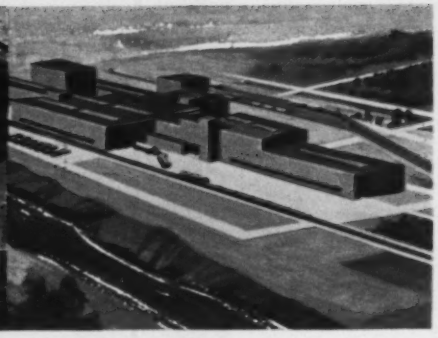
BARNES DRILL CO.

854 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE • 13121 PURITAN AVENUE

FIVE MAJOR STEPS TO FURTHER PROGRESS



AT GREAT LAKES STEEL in Detroit, the computer-controlled and operated 80" Mill of the Future—fastest, most powerful hot-strip mill in the world—will provide more and better automobile body sheets.



AT MIDWEST STEEL near Chicago, the most modern and efficient steel finishing plant in existence will provide industry with the finest quality tin plate, galvanized sheets, hot- and cold-rolled sheets.

George M. Humphrey,
Thomas E. Millsop and Paul H. Carnahan,
top men at National Steel Corporation, talk about . . .

NATIONAL STEEL'S $300 MILLION OF NEW CONSTRUCTION . . .

and what it means to you

The huge program begun three years ago by National Steel is nearing completion. Costing in excess of $300 million, it is a signal of continuing progress at National Steel. It is the result of a never-ending search for the new and the better.

It is tangible evidence that private citizens have firm confidence in the future and are willing to back this confidence with huge amounts of private money. It is the kind of thing, throughout our economy, which provides the solid foundation for widespread American prosperity . . . and for which there is no substitute.

There are obvious benefits, of course, that will result from this construction program.

TO OUR EMPLOYEES—it means better, more secure, more stable jobs.

TO OUR CUSTOMERS—this expansion means the assurance of steel supply in volume during periods of peak demand. In any period, the expansion means steel of the highest and most uniform quality ever produced.

TO OUR COMPANY—it means higher efficiency, greater stability and lower costs throughout our operations . . . factors which provide us with a stronger competitive position in the market place.

TO YOU AS A CONSUMER OF STEEL—it means better products because of better steel. It means greater value for your dollar in the products you buy.

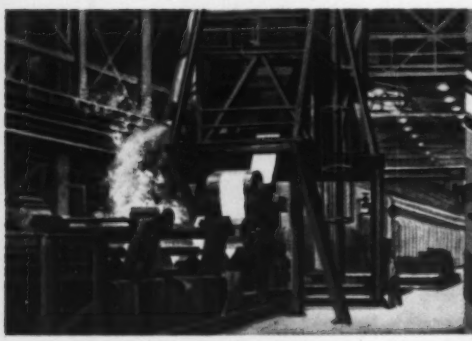
TO YOU AS AN AMERICAN—it means a powerful weapon against inflation; it means more strength for America faced with competition against the low-cost labor and newly added modern techniques of foreign producers. And it means a greater industrial base for national security.

As National Steel's new facilities come into operation during the months ahead, we'll tell you more about them. And we think you'll agree that it will be good news for our employees, our customers, our company and for you.

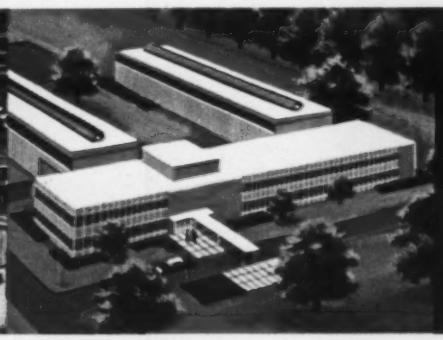
NATIONAL STEEL CORPORATION, PITTSBURGH, PA.

SUBSIDIARIES AND DIVISIONS:

GREAT LAKES STEEL • WEIRTON STEEL • MIDWEST STEEL • STRAN-STEEL • ENAMELSTRIP • HANNA FURNACE • NATIONAL STEEL PRODUCTS



AT WEIRTON STEEL in Weirton, W. Va., new and improved facilities throughout this division will increase the production and improve the quality of Weirton's tin plate, galvanized sheets and cold-rolled sheets.



OUR NEW RESEARCH CENTER will be National Steel's headquarters for the expanded, continuing exploration of new and better raw materials, facilities, manufacturing processes and products of steel.

A BASIC OXYGEN STEELMAKING SHOP, including two of the largest vessels ever built, is now under construction at Great Lakes Steel in Detroit to increase the flexibility and efficiency of our operations.

only a **CLEAN-LINE**® furnace from hevi-duty brings you . . .

Only "Clean-Line" Heat Treat Furnaces from Hevi-Duty offer so many ways to speed production, cut maintenance and improve output. Consider these advantages:

1. Complete, automatic, "straight-through" operation from loading through quench.
2. Vestibule-housed transfer pusher head only under heat during 9-second transfer cycle. You get trouble-free operation.
3. Expansion seals for radiant tubes are at *cold* end. This system maintains tight atmosphere seal, lengthens tube life.
4. Externally located heat exchanger and pump for easy maintenance and high penetrating oil flow in the quench cycle.
5. Fan circulation for even distribution of heat *without* use of baffles.
6. Compact loading table — just 1½ baskets long — for savings in floor space.
7. Fuel-fired or electric models available.
8. Special options — automatic quench retractor, double-chamber design for two independent temperatures and two independent atmospheres, temperatures to 2100°F.

Suitable for carbonitriding, carburizing, bright hardening, annealing, normalizing and brazing, the standard "Clean-Line" furnace is used for heat treatment of metal to 1850°F. Complete systems are available . . . including heat treat and quench unit, gas generator, washer and tempering furnace.

Hevi-Duty's "Clean-Line" furnace is just one in a full range of products: heat treating furnaces, ferrous and nonferrous metal melting and holding furnaces, and industrial ovens — all available fuel-fired or electric. Get full details from your Hevi-Duty sales engineer or write to Hevi-Duty, Watertown, Wisconsin, for Bulletin D 100A.

HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

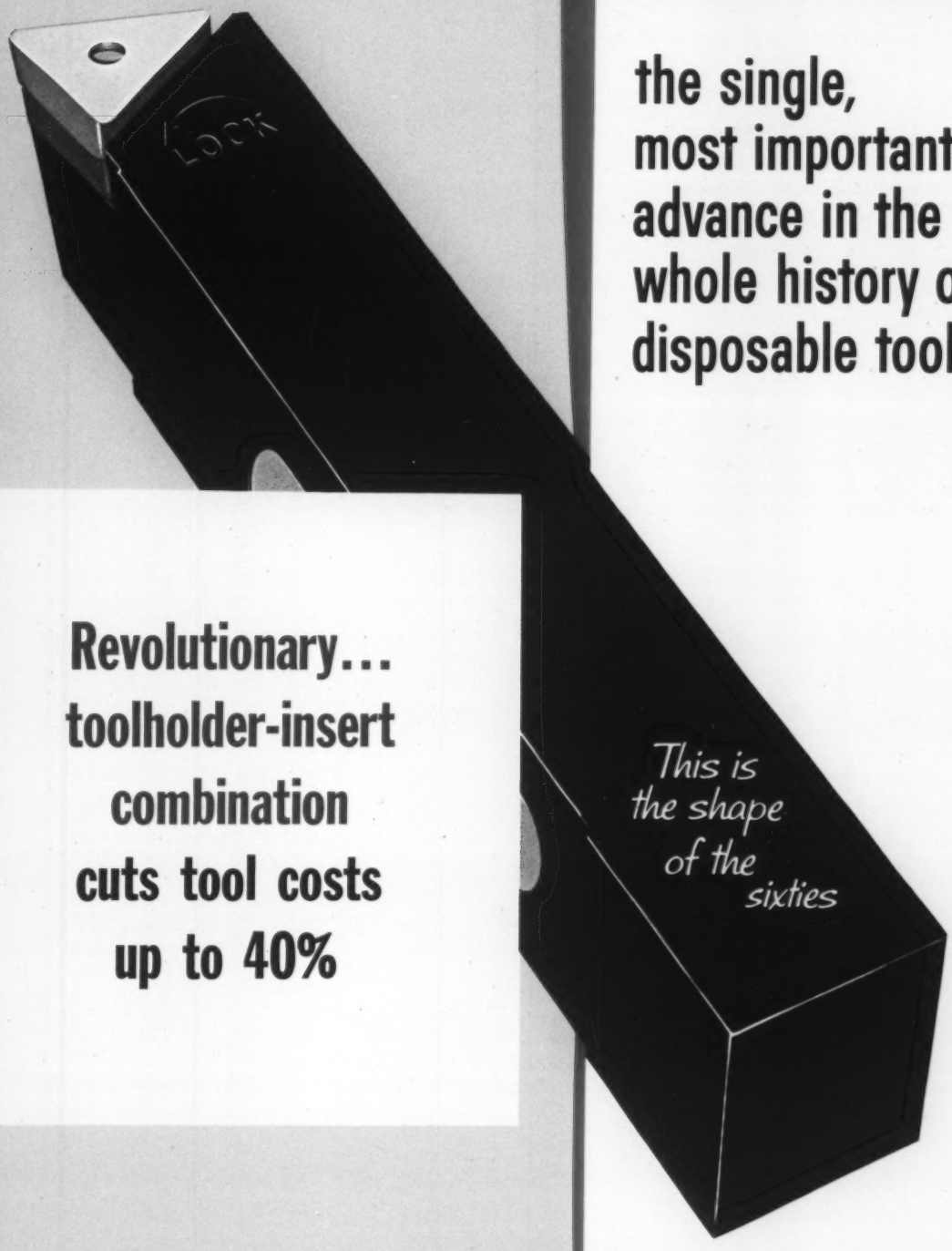
Hevi-Duty Electric Company, Watertown, Wis.

A Division of Basic Products Corporation

General Electric announces

Carb-O-Lock

the single, most important advance in the whole history of disposable tooling!

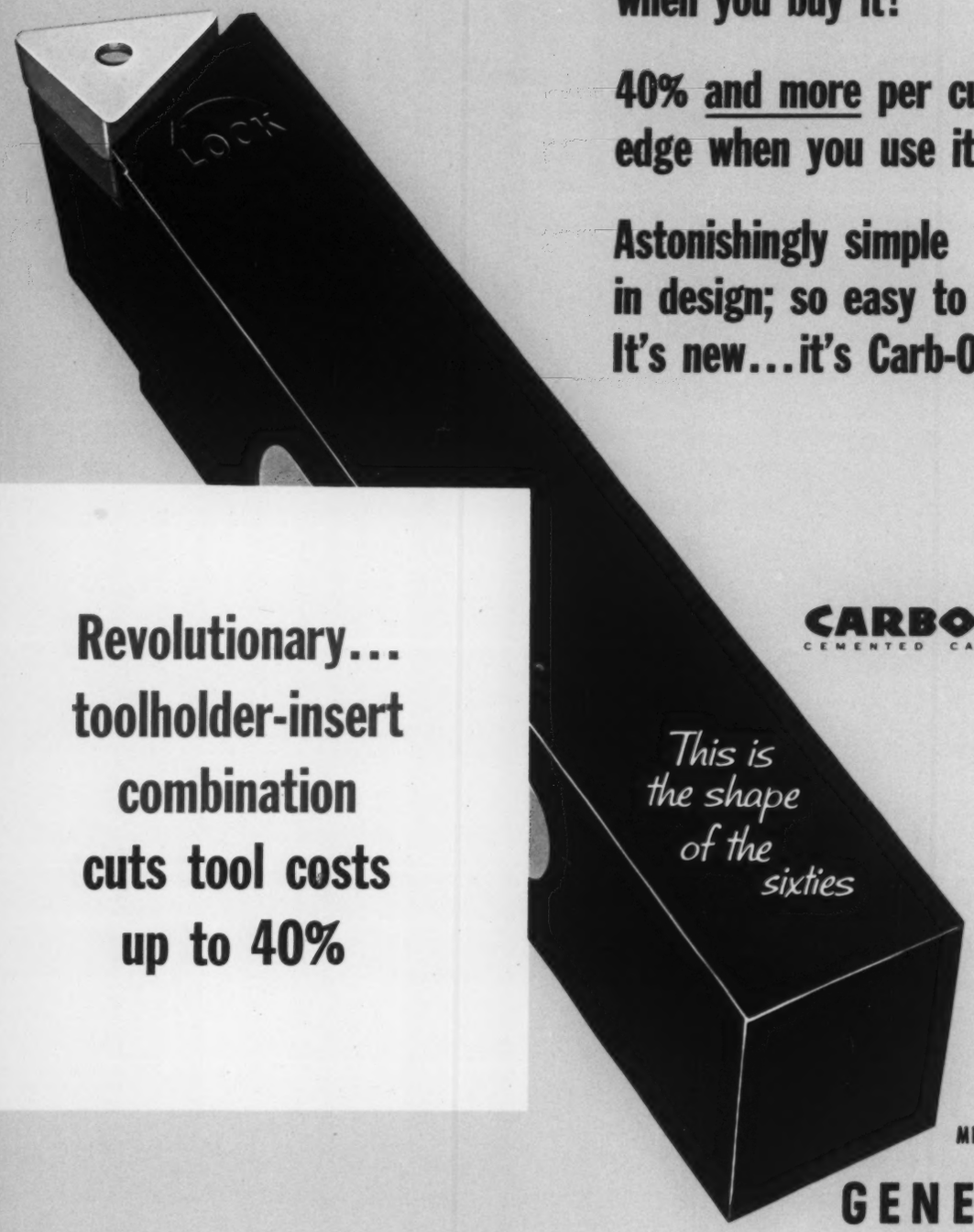


Revolutionary... toolholder-insert combination cuts tool costs up to 40%

New Carb-O-Lock toolholder-insert combination offers unheard of savings... 30% and more when you buy it!

40% and more per cutting edge when you use it!

Astonishingly simple in design; so easy to use. It's new...it's Carb-O-Lock!



Revolutionary... toolholder-insert combination cuts tool costs up to 40%

CARBOLOY®
CEMENTED CARBIDES

Think of it! Now you can cut your disposable tooling costs by up to 40%! This revolutionary Carb-O-Lock toolholder-insert combination costs 30% less to buy than ordinary toolholders . . . costs 40% less to use. You save and keep on saving, because savings are designed right into the new Carb-O-Lock toolholder-insert combination.

The Carb-O-Lock is truly unique in toolholder design. *Simplicity* is the key! Carb-O-Lock employs just *three* parts (not including insert) — compared with up to 12 parts in other toolholders. Using a cam-action locking principle, the Carb-O-Lock toolholder makes insert changing and indexing a breeze . . . easy as one, two, three! And the streamlined design of this revolutionary toolholder lets you bring it closer to the work, with unrestricted chip flow. No clamps . . . no "clubheads" . . . no complex mechanisms.

HANDLES MOST OF THE FOLLOWING MACHINING JOBS

Carb-O-Lock toolholders are available right now in toolholder shank sizes from ½" square to 2" square for square inserts and ½" to 1½" on toolholders for triangular inserts to be *used profitably in your shop.* The specially processed close-tolerance, disposable inserts have been developed in Carboloy® Grade 883 for machining cast iron as well as many operations on the following materials: high-temperature alloys, type 300 stainless steel, brass, and bronze.

Look over the features on the next page. See just how this brand new toolholder-insert combination can mean big savings in *your* metalcutting operation. Phone your Authorized Carboloy Distributor and place your order. Then use Carb-O-Lock — designed to bring you even *better profits through better tooling.*

Great! . . . *revolutionary!*

Metallurgical Products Department of General Electric Company, 11173 E. 8 Mile Avenue, Detroit 32, Michigan.

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMOND • MAGNETIC MATERIALS
THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

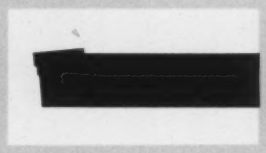
Simplicity is the key

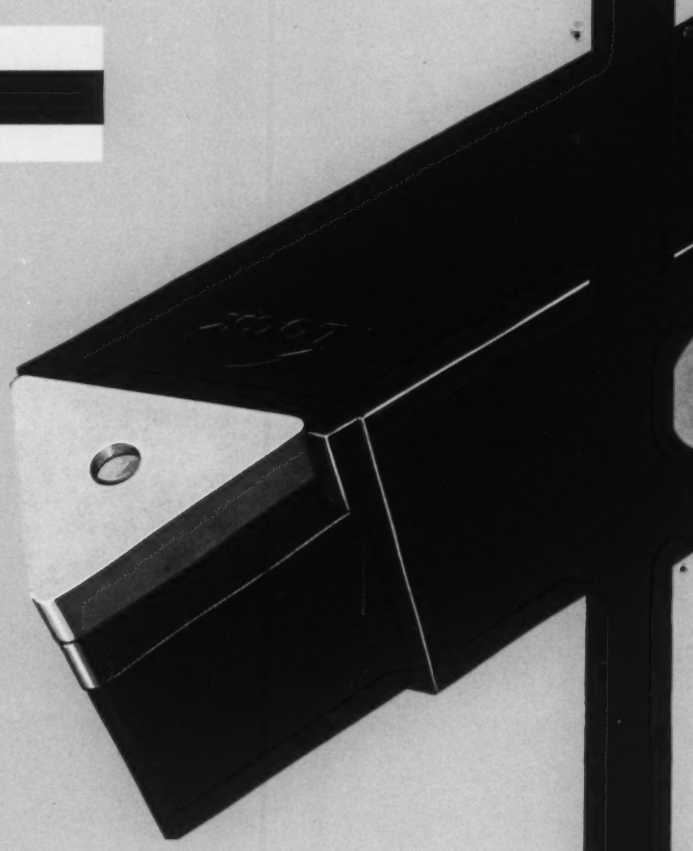
Check these features...

The all-new Carb-O-Lock toolholder-insert combination was developed for just one reason: To reduce your present machining costs. Can it? Yes. Here's why . . . and how.

LOW, LOW SILHOUETTE

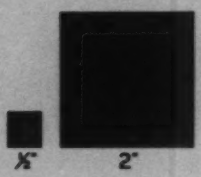
No "clubheads," clamps, or screws sticking up to take up space or interfere with the chip flow – not even on the smallest size (½" square shank) Carb-O-Lock. Nothing to wash off or wear away.





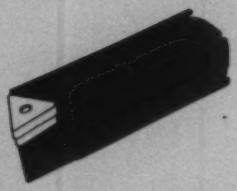
FEWER PARTS

Carb-O-Lock employs just three parts (not including insert): Hard-tough cam pin, Carboloy carbide seat, heat-treated shank. Results—decreased parts inventory, absolute minimum possibility of part failure, greatly reduced downtime, lower replacement-part cost, and lower over-all cost.



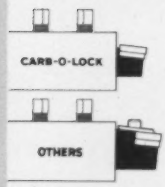
PICK THE ONE YOU NEED

Carb-O-Lock comes in 15 styles, 124 sizes for triangular and square inserts. Shank sizes from ½" square (use it to replace your brazed tooling, too!) to 2" square.



LOOK... NO POCKET!

Carb-O-Lock gives you larger end-cutting edge angle because no pocket is needed to retain insert. Can often be used on many tracer applications with limitations on plunge angle.



REDUCED OVERHANG

Reduces space requirements for locking mechanism—less deflection and vibration. This means less insert chipping and breaking, for longer, more consistent tool life.

TOUGHER

The cam pin in the Carb-O-Lock is a high-alloy bearing steel. Has not broken under the severest use. Cam action forces insert against shank, so insert stays locked in place until *you* loosen it. Cam pin is adjusted from underneath. Self-cleaning, self-locating wrench socket . . . never clogs . . . makes indexing and changing of inserts a breeze.

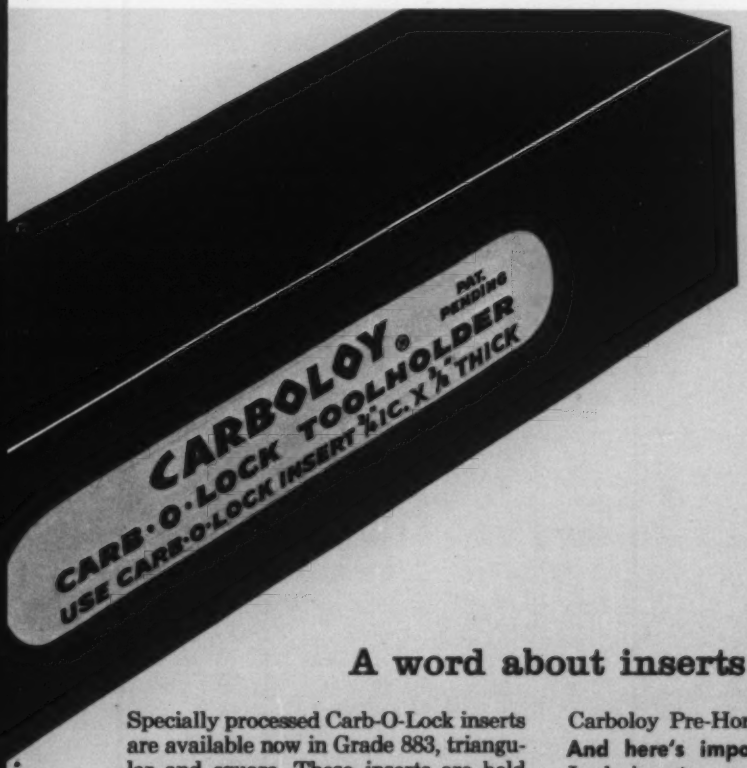
ONE-TWO-THREE INDEXING

THIS ✓ IS ALL YOU NEED. JUST TWIST,

REPLACE OR INDEX INSERT,

TWIST.

to the new Carb-O-Lock



A word about inserts

Specially processed Carb-O-Lock inserts are available now in Grade 883, triangular and square. These inserts are held to tolerances of ± .002" on ¼" I.C. to ± .004" on the 1" Sq.. They cost 40% less than some precision-ground (± .001") inserts.

These inserts have cutting edges composed of whole carbide crystals which are stress free, and notch free like Carboloy Pre-Honed inserts.

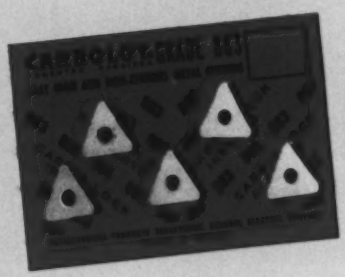
And here's important news. Carb-O-Lock inserts are designed to fit most square or triangular negative rake toolholders you may now be using. This means that while you are changing your operation over to Carb-O-Lock, you can begin by buying the new inserts. Then, as you replace your present toolholders, just order the new Carb-O-Lock. Simple.

NOTE TO SPECIALIZED SHOPS

We can't overstress the importance of the Carb-O-Lock toolholder-insert combination to those who are *not* using carbide disposable tooling in their machining operations. Up until now, if you wanted to use disposable-insert carbide tooling, the cost of the toolholders may have represented an investment that was larger than you cared to make.

Not so now. No longer must you settle for second best. Because the new Carb-O-Lock fits easily into your tooling budget. Now you can have the quality of carbide tooling at the lowest cost ever – even lower than your present tooling. And the broad range and sizes give you the flexibility that makes carbide tooling on small-lot jobs economical. Check into it . . . and see!

. . . and about packaging



Carb-O-Lock inserts come skin-packed on a color-coded card with complete identification which fits in a standard 3" x 5" file drawer for easier storage and inventory, faster identification, simpler handling.

Carb-O-Lock Grade 883 inserts are skin-packed — five or ten to a card depending on size. This means: Easier inventorying • Chipping is eliminated • No surface contamination from handling • Color-coded grade identification • Cards fit standard-size filing cabinet.

Your Authorized Carboloy Distributor can supply you with the new Carb-O-Lock inserts in Grade 883 now. Call him today.

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METALLURGICAL PRODUCTS DEPARTMENT

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THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

ACT NOW!
YOUR SAVINGS BEGIN WITH CARB-O-LOCK!

The quality of leadership!

The leaders of hundreds of America's major industries have, for twenty years, matched beliefs with action by supporting the Payroll Savings Plan for U.S. Savings Bonds. On this, the 20th Anniversary of this great idea, we salute the quality of leadership which continues to use this plan to create reserve public buying power, improve employee morale and strengthen the economy of our country. To learn how your company can benefit from the Payroll Savings Plan, write: **U.S. SAVINGS BONDS DIVISION, TREASURY DEPARTMENT, Washington 25, D.C.**

20th ANNIVERSARY 1941 1961

STEEL The Metalworking Weekly

The U.S. Government does not pay for this advertisement. The Treasury Department thanks, for their patriotism, The Advertising Council and the donor above.

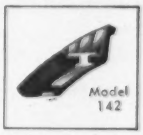
ENGINEERED OIL SEALS
for Steel Mills

Garlock KLOZURE* Oil Seals (left) help keep lubrication in, dirt out of roll neck bearing at Inland Steel's East Chicago mill.

Inland Steel applies Garlock KLOZURE Oil Seals for protection of mill roll neck bearings at East Chicago.

Minimizing lubrication leakage from the inboard and outboard ends of the bearings, Garlock KLOZURE Oil Seals provide more constant service as the rolls change position in a lateral movement during operation. Inland finds, too, that in atmospheres of dirt, scale and spray, KLOZURE Oil Seals help keep foreign particles from entering—and damaging—the bearings.

For good, economical bearing protection, Inland joins the growing list of steel producers who use Garlock KLOZURE Oil Seals. Wherever you look in mills, you'll find a specific type of KLOZURE Oil Seals doing a specific job. Model 142, for instance, helps keep water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 protect bearings on back-up and work rolls. Model 53 is recommended for table rolls at normal and high speeds. Model 23 Split KLOZURE is ideal where equipment cannot be dismantled too easily.



Designed for peak efficiency and durability, Garlock KLOZURE Oil Seals resist oil and grease, are impervious to water, mild acids, alkalies, withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

If you have a particular sealing problem, why not discuss it with your Garlock representative. He's backed by over 70 years of experience in engineering, production and application. Call him at the nearest of the 26 Garlock sales

GARLOCK

offices and warehouses throughout the U. S. and Canada. Or, write for Catalog AD-181, Garlock Inc., Palmyra, New York.

Canadian Div.: Garlock of Canada Ltd.

Plastics Div.: United States Gasket Company

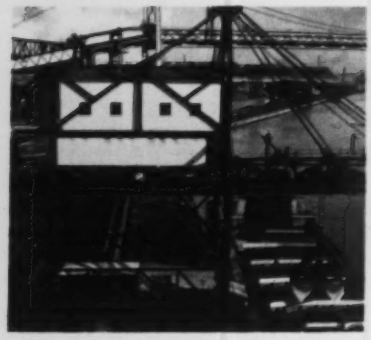
Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

*Registered Trademark

How Dravo serves the steel industry

MATERIALS HANDLING EQUIPMENT

New 1650-ton-per-hour unloader and a companion ore bridge rated at 1360 tph speed ore handling for midwest steel producer. Check the coupon at right for details on Dravo bulk materials handling equipment for mills, plants or docks.



ORE PROCESSING

Over 45% of sinter capacity added by U.S. steel industry in last 5 years has been furnished by Dravo—including this 2400-ton-per-day plant. Check and mail coupon to obtain more information on sintering, briquetting, pelletizing and ore beneficiating plants.

SPECIAL CONSTRUCTION

Head frame (left foreground of photo) sits astride 575-ft. concrete-lined ventilating shaft at a steel company mine. Construction of shafts, slopes, tunnels, docks and harbors are part of Dravo's half century of experience in special construction. Mail coupon for information.

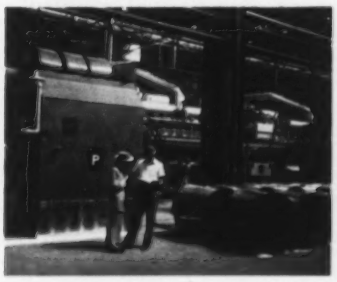
Dravo furnished ore unloader, ore bridge and sinter plant for this midwestern steel producer.

PLANT UTILITIES

When completed, this modern intake and pumping station will handle up to 30 million gallons of water daily. Such Dravo turn-key projects include oxygen, power and boiler plants, compressor stations, other special utility and plant facilities. Mail coupon for information.

SPACE HEATING

One of 60 Dravo space heaters which supply comfort heating in this large strip mill. Over 20,000 units (¼ to 3 million btu) are in use throughout industry for all types of manufacturing and warehousing structures. Check and mail coupon for details.



Dravo Corporation, 4557 Grand Avenue, Pittsburgh 25, Pa.

Please send me information on the following products and services

☐ Oxygen Steel-making	☐ Ore Bridges	☐ Docks, Harbors
☐ Oxygen Plants	☐ Towboats	☐ Water Intakes
☐ Mill Lubrication	☐ Barges	☐ Shafts, Tunnels
☐ Sinter Plants & Coolers	☐ Briquetting	☐ Space Heaters
☐ Ore Beneficiation	☐ Pelletizing	☐ Container Cranes
☐ Ore & Coal Unloaders	☐ Grating	☐ Fabricated Piping

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

DRAVO

ALLIS-CHALMERS

Lift Truck Attachments

Put the HAND in "Handling"...

Tote box is being dumped with a rotator-equipped Allis-Chalmers lift truck. Rotator will travel 360° in either direction.

With the appropriate attachment, you can take most any load and . . .
squeeze it . . .
shift it . . .
push it . . .
scoop it . . .
pull it . . .
rotate it . . .
dump it . . .
steady it . . .
swing it.

Owners find a big dollar-saving difference in the performance, ease of servicing, and over-all durability of Allis-Chalmers lift trucks.

And these advantages are not confined to routine pallet-handling jobs, either. The full line of easy-to-mount attachments makes Allis-Chalmers lift trucks almost as flexible as your own two hands.

Have your Allis-Chalmers dealer show you how the right attachment quickly pays for itself by extending the usefulness of the lift truck — by moving a larger volume of material and by reducing damage. Allis-Chalmers, Milwaukee 1, Wisconsin.

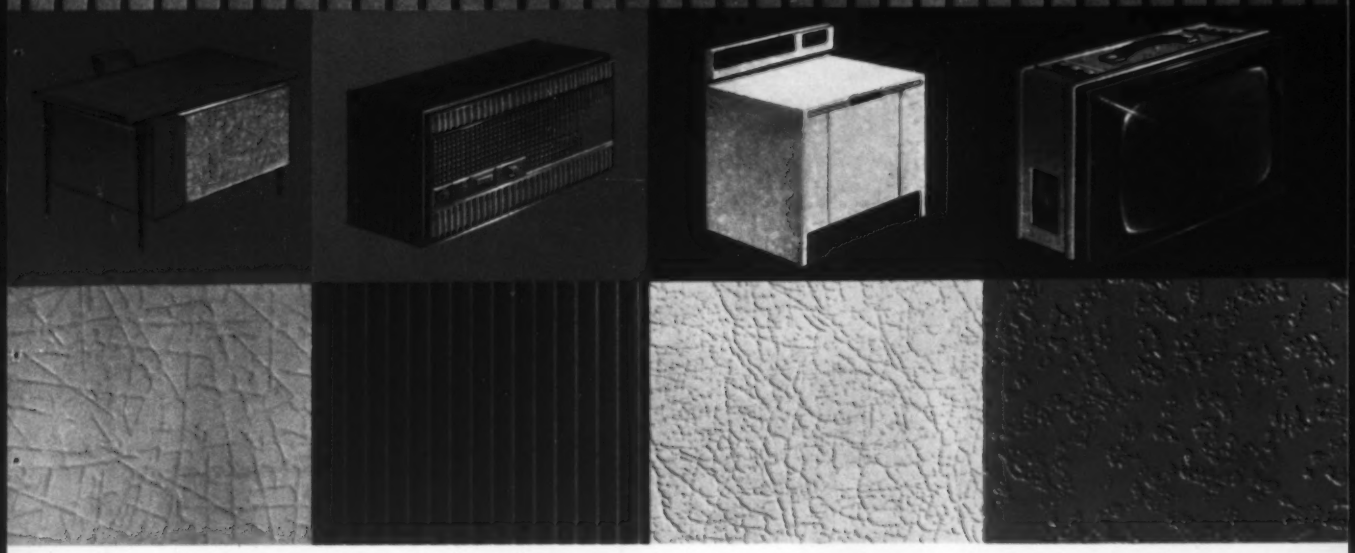
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

BH-169A

PICK A PATTERN FOR YOUR PRODUCT FROM PITTSBURGH STEEL SHEET



Wrapper stock or drawn parts, flat panels or roll-formed fittings—whatever the application, Wide Pattern Designed Sheet gives finished products snap and sparkle that attract buyers, boost sales. Patterned Sheet—as wide as 60 inches, thicknesses from .0179 to .0897 inch—is available in commercial, drawing and AK drawing quality steel; has same fabricating properties as plain cold-rolled sheet in your processing equipment. Rolled-in designs—unlimited in range—take paint, enamel, porcelain, plated finishes. Investigate Wide Pattern Designed Sheet—steel with decorative appeal, from . . . PITTSBURGH STEEL COMPANY, Pittsburgh, Pa.

for other steel specialties turn page.

HOW "BOSTON" PROFITS FROM THOMAS NICKEL-COATED STRIP

Thomas Strip buffed nickel-coated steel strip reflects 40% saving, fewer production steps for C. Howard Hunt Pen Co.'s pace-setting "Boston" pencil sharpeners.

At Statesville, N.C., Hunt Pen blanks, embosses, pierces, spot-welds wrapper stock for sharpener cases from coils of 2 by .010-in. buffed nickel-coated steel. Firm has depended on Thomas Strip Division of Pittsburgh Steel Co. 20 years for brilliant finish. Purchasing Agent T. V. McCurdy tells why:

"We once used stainless for wrapper stock but costs skyrocketed. Thomas Strip costs 40% less, gives us handsome appearance, durability and easy fabrication of steel. It eliminates expense and headaches of plating, too.

"We're more critical of this material than any other—the slightest scratch stands out. We've never had to reject any during our long relationship with Thomas."

Hunt Pen produces more pencil sharpeners with nickel-plated strip than any other U.S. manufacturer. Assembly of "Champion" portable model is shown above.

Want to learn how Thomas Pre-Coated Strip Steel Specialties can help you? Ask, and we'll show you.

"WE GET BETTER PRODUCTS FOR LESS WITH THOMAS PRE-PAINTED STRIP," SAYS NATIONAL GYPSUM COMPANY

Tough, durable vinyl-enamel coat on Thomas Pre-Painted Strip fabricates easily as plain steel, gives a profitable boost to "Gold Bond" quality of National Gypsum Company's metal building products.

Exposed pre-finished partition bases, cornice moldings, wall trim and "J" suspension channels are roll-formed by National Gypsum Company's Niles, O., Metal Building Products plant. Coiled strip sizes range from 18 to 24 gage in widths $2^{17}/_{32}$ to $4^{1}/_{2}$-in., painted one side with white, grey or red, and wash-coated opposite side.

"Thomas Strip Pre-Painted gives us products far superior to those we got when we spray-painted after forming. It saves us 8.75 to 9.2% of production cost and reduces inventory problems," says Plant Manager D. K. Archer.

"The paint coat has better adhesion and takes roll forming without cracking or peeling. Thomas supplies us superior material of uniform, consistent quality that suits our requirements."

Photo below: roll forming 10-ft. Snap-On bases.

Eliminate your paint-line problems with Thomas Pre-Painted Strip. Let us show you how.

PITTSBURGH STEEL COMPANY

SQUEAKS, RATTLES SILENCED WITH THOMAS PLASTIC-COATED STRIP

Primary use of Thomas Plastic-Coated Steel is in decorative applications. But it performs a unique practical task for manufacturers of fine furniture.

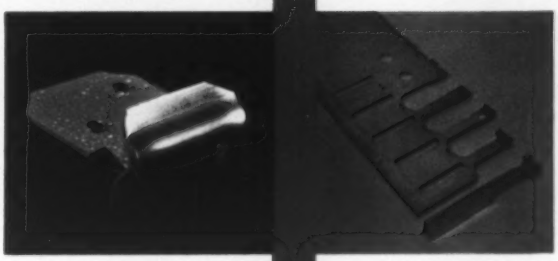
Laminated to Thomas cold-rolled strip, the plastic coating assures absolutely noiseless functioning of modern, strong steel springing.

Universal Wire Spring Division of Hoover Ball & Bearing Co., Georgetown, Ky., uses Thomas Plastic-Coated Strip to make spring retainer clips that anchor its sinuous wire Uni-Torq and Uni-Flex springs to furniture frames.

"We tried applying pressure-sensitive tape to steel for this clip, but decided on Thomas Plastic-Coated. It's pre-finished and doesn't slip or peel in forming or in use," says Bernie J. Johnson, sales vice president, upholstery spring division.

"The clip acts as a pivot as well as an anchor for our engineered seating springs. Steel against steel produces squeaks and rattles. The plastic coating eliminates them—and makes an important sales point."

Decorative or functional —whatever the need, Thomas Steel Specialties will make your product better, too.



THOMAS STRIP HELPS "BUILD A BETTER MOUSETRAP"

World's biggest trapmaker, Animal Trap Co. of America, has the long-sought "better mousetrap." And Thomas Strip Copper-Coated Steel helps make it so. Rattraps, too.

Animal Trap Co. of America, Lititz, Pa., has depended on Thomas Strip over 25 years for close tolerance copper-coated steel strip to make bait pedals, locking bars for a dozen models.

The firm produces millions yearly from Thomas electroplated stock in sizes from .4375 by .025-in. to 5 by .035-in., #2 temper. Precise tolerances, consistent temper of base steel allow long, trouble-free runs through progressive dies, automated assembly lines.

"Base steel gives strength, economy—the planished copper finish provides appearance and corrosion resistance needed to out-sell cheap foreign-made traps," says Sales Vice President D. S. Morrison.

Want the world to beat a path to your product's door? Thomas Strip plain or coated steel specialties may be what you need. Ask.

PITTSBURGH STEEL COMPANY

BRASS-COATED THOMAS STRIP SAVES FOLDING-RULE MAKER 60% IN METAL COST

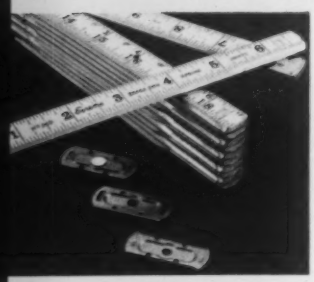
Thomas Strip Brass-Coated steel measures up to strict cost, tolerance, strength and appearance standards for Evans Rule Co. of Elizabeth, N.J., leading producer of measuring rules and tapes.

An improved type of wood folding rule—assembled with 11 patented spring joints, fabricated from Thomas electro brass-coated strip—is produced for Evans by a subsidiary—Fabrule Co.—in a fully automated plant.

For rule joints, Evans buys two sizes of Thomas brass-coated strip—1.812 and 1.562 in. wide by .012-in. thick, #3 temper, planished and oiled.

"Brass-coated strip saves us about 60% over what we'd pay for pure brass for rule joints," says John J. Evans, board chairman.

"Besides that, the base steel supplies strength to take abuse, as well as rigidity needed when the rule is opened. The brass coat provides protection against corrosion and the planished finish results in a sales boosting appearance. Physically, width and temper uniformity is critical for processing through our automated lines."



Do expensive metals hike your product cost? Inquire how Thomas Strip pre-coated steel can help you save.

The STEELMARK on a product tells you it is made of steel. Look for it when you buy.

Steel

NEW—BRUSH PATTERN DESIGN FOR THOMAS PRE-COATED STEEL

Here's a **brand new** addition to Thomas Strip Division's wide range of pre-coated and pattern designed finishes for decorative applications.

Called "Brush Pattern Design," this new Thomas Strip specialty reduces finishing costs, enhances sales appeal through its deep, lustrous, textured and buffed surface—offers products attractive "plus" that influences buying decision, moves items off the shelf.

"Brush Pattern Design" is cold-rolled strip electroplated with copper, brass, nickel or zinc coating, buffed to soft highlighted finish, protected by clear lacquer.

New Thomas Strip technique produces Brush Pattern Design Strip with uniform, nontarnishing plated coating across entire surface. Fabricates easily, without distortion of pattern finish.

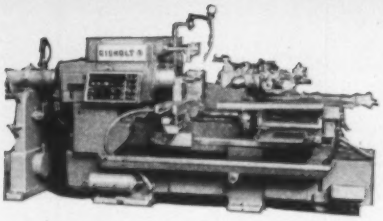
Reduce your product's finishing costs, improve its appearance with Thomas Brush Pattern Design. Thomas experience, design help is yours for the asking. Call or write.

THOMAS STRIP DIVISION
PITTSBURGH STEEL COMPANY
Grant Building · Pittsburgh 30, Pennsylvania

DISTRICT SALES OFFICES

Atlanta	Chicago	Detroit	Philadelphia
	Cleveland	Houston	Pittsburgh
	Dallas	Los Angeles	Tulsa
	Dayton	New York	Warren, Ohio

SOMEBODY
is doing it for
LESS



GISHOLT MASTERLINE AR TURRET LATHE Converts for bar or chucking work in less than one hour. Sets up like a turret lathe, from the front—no gears to change—uses same standard tools. Cycle setting is learned in less than a day. Compare these extras: greater capacity at lower original cost than any comparable automatic; automatic withdrawal for chip clearing in deep holes; internal threading with solid taps requiring spindle reverse; external threading with self-opening die heads and automatic re-cocking; reverse feed and individually adjustable dwell to all tool stations; 16 spindle speeds and infinite feeds—none lost when threading. Optional: 8-sided turret; overhead cut-off slide or swinging stock stop; automatic recessing slide tools; JETracer® with turret slide tools.

Ask your Gisholt Representative for a desk-side demonstration, or write for Catalog 1224.

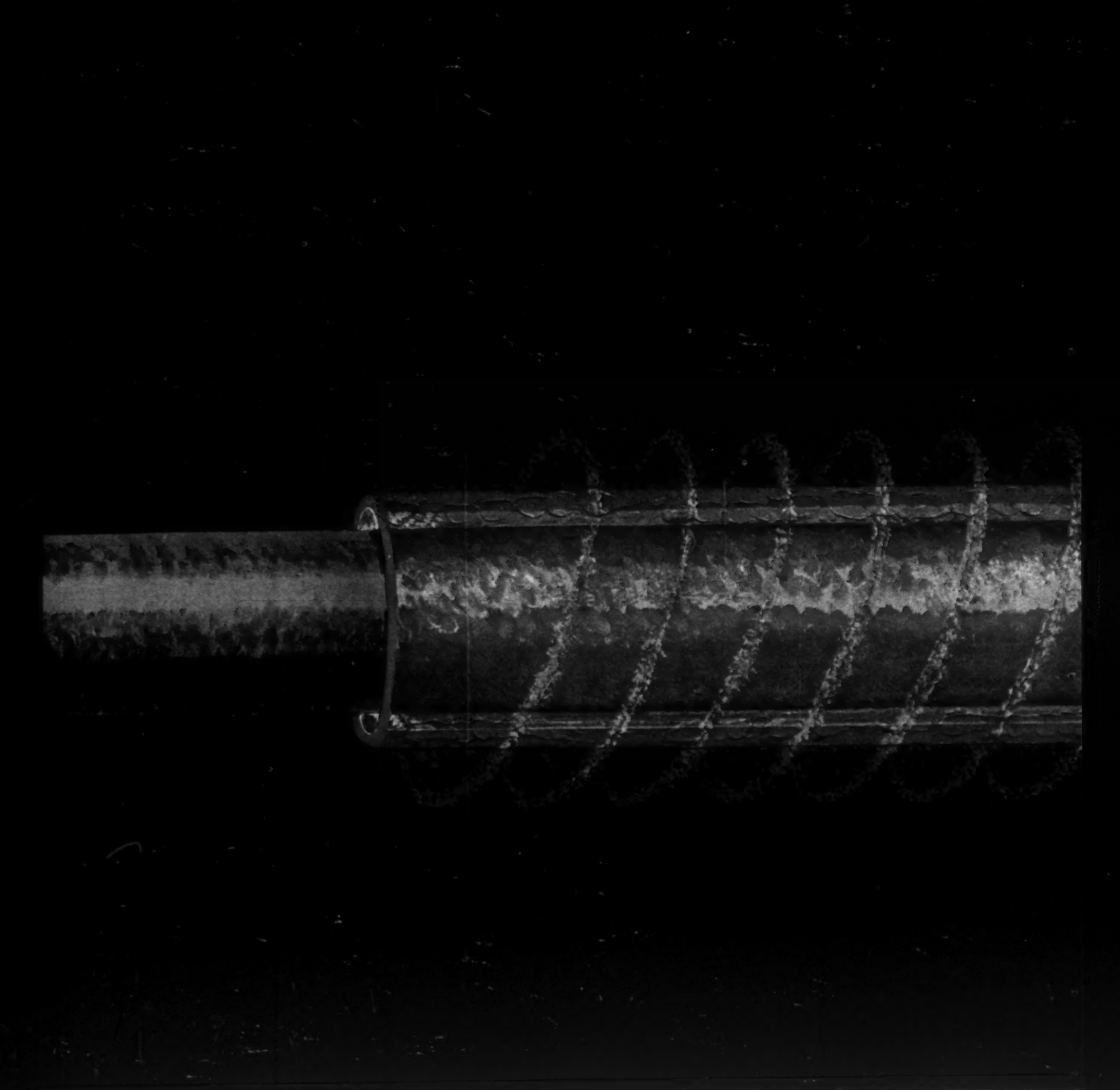
With recent developments in automatic machining, many manufacturers—maybe your toughest competitors—are cutting costs substantially.

Even small runs are going automatic—both bar and chucking work too! All this with the Gisholt AR® Turret Lathe at little more than the cost of a hand-operated turret lathe.

This is no exaggeration: the Gisholt AR can cut your *direct* machining costs by 25% to 40% on work now handled on manual lathes—can give you *indirect* savings in tooling, inventory, setup, inspection, materials handling and floor space. Investigate AR—your best answer to the cost-profit squeeze.

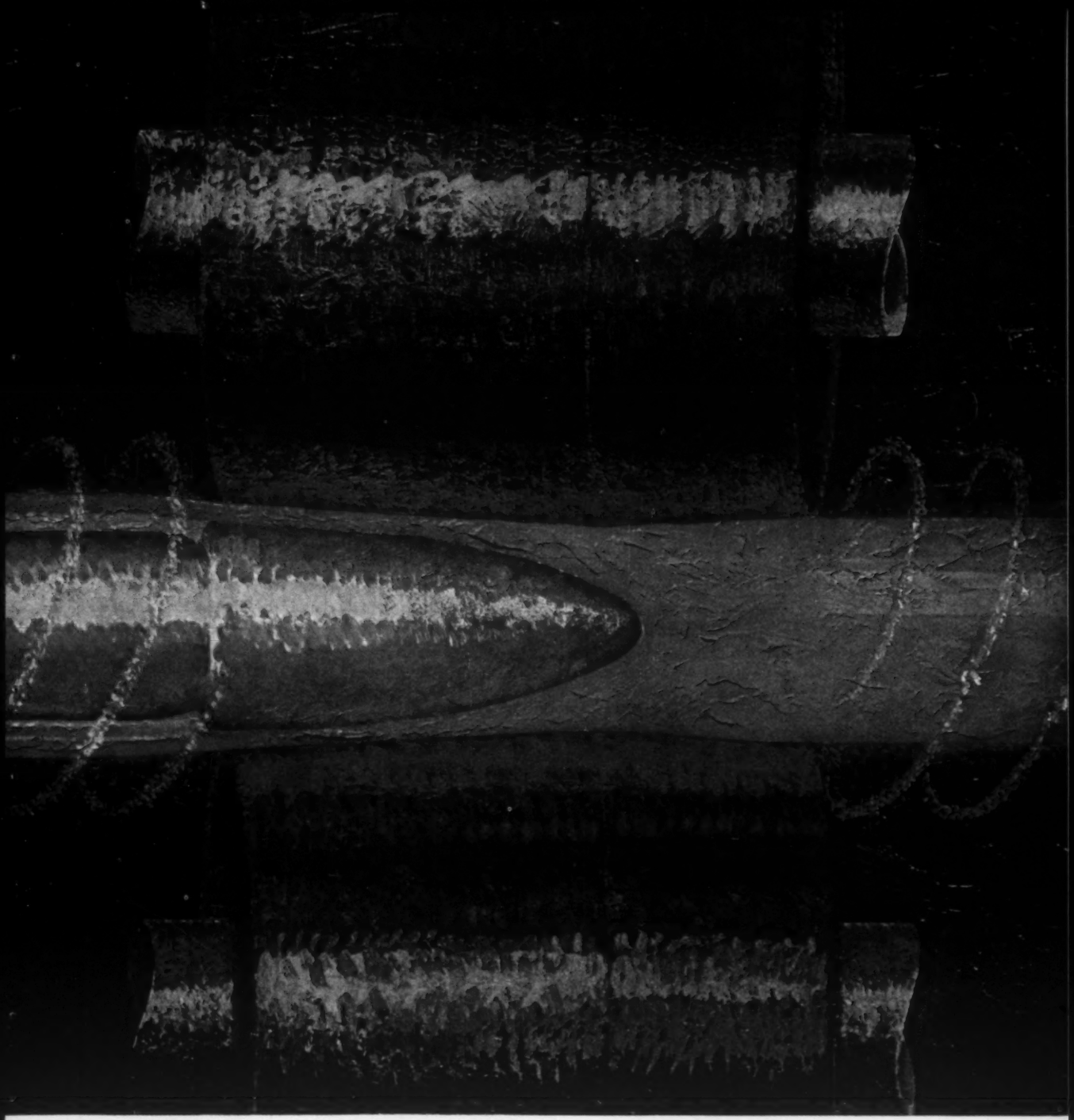
GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee



Remember the good old ways

This mark tells you a product is made of modern, dependable Steel.



The piercing operation is one of the first steps in creating seamless pipe or tubing from a solid section of steel. After we set the hot steel billet in place, we ram it. Spin it. Push its insides out. And stretch it into a hollow many times longer than the original piece of steel.

There's nothing new about making seamless tubular products this way—we've been doing it for 70 years. This doesn't mean that we're old-fashioned—but sometimes the old ways are best. Whether we use an old established method or a revolutionary new one, whatever is the best way to make pipe or tubing is how National Tube makes it.

USS is a registered trademark

USS

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors

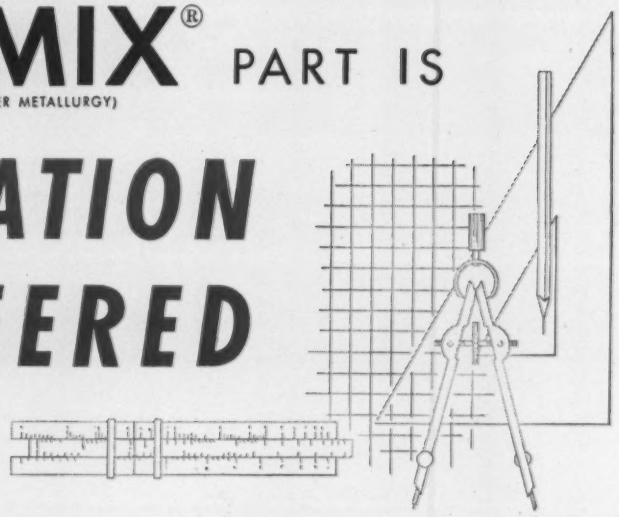
United States Steel Export Company, New York

TO INSURE SUCCESSFUL PERFORMANCE

EVERY GRAMIX® PART IS

(PRODUCTS OF POWDER METALLURGY)

APPLICATION ENGINEERED

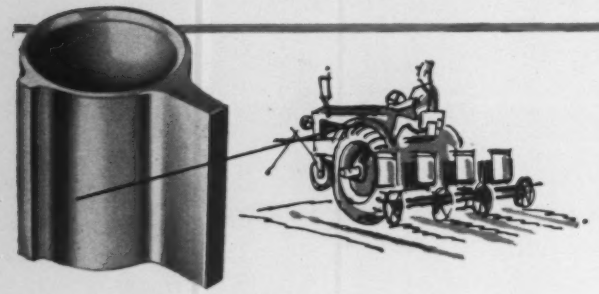


One of the most important factors to consider when purchasing powder metal parts is that of successful part performance; for a part to successfully perform its job, all of its physical and metallurgical characteristics must be suited to the application.

GRAMIX Products of Powder Metallurgy are always *Application Engineered,* which means product is specially matched to each specific application. From an almost unlimited variety of metal mixtures, one alloy is blended that contains the required properties and characteristics of the finished part; *all* aspects of part design and conditions under which it must operate are taken into account. Only then is the GRAMIX part produced.

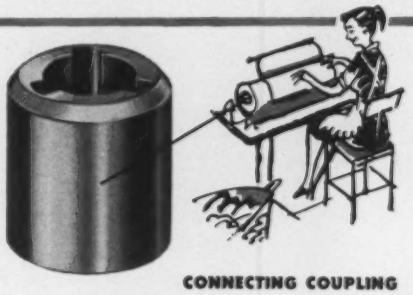
Eight of these *Application Engineered* GRAMIX parts are shown here. Each precisely suits the requirements of its job . . . each is the best part available for the job.

When you specify a GRAMIX part, you can always be sure that it has been *Application Engineered* for successful performance, long life and complete reliability. For more information on *Application Engineered* GRAMIX parts, write for Engineering Handbook G-55.



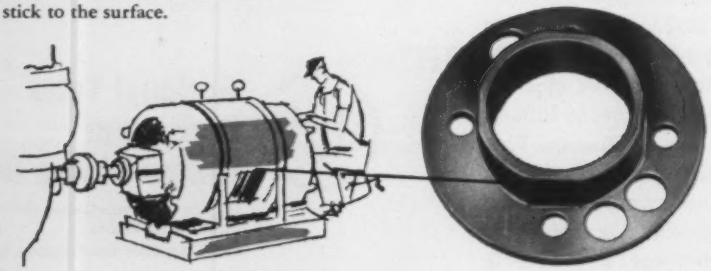
CORN SEEDER

GRAMIX was the material specified for this corn seeder part because the surface finish obtainable with the alloy used reduced the tendency of material to stick to the surface.



CONNECTING COUPLING

The connecting coupling employed in a small home ironer is formed from a special GRAMIX hardened steel alloy; it offers low wear and shock resistance.



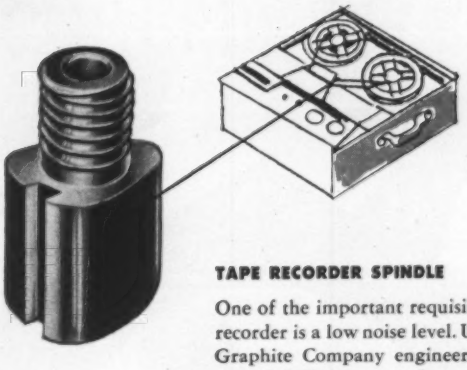
CONTAINER COVER END CAP

Great savings were realized when retainer caps for certain types of electric motors were made of GRAMIX.

This process made it simple and economical to mold the multiple holes to precise tolerances without extra operations.

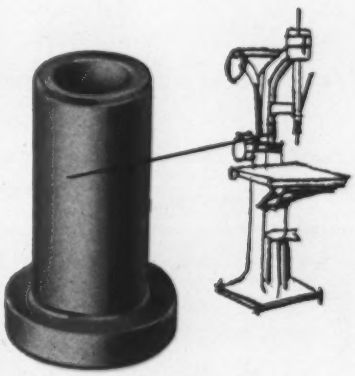
HELICOPTER THRUST WASHER

The outstanding features of the GRAMIX alloy specified for this thrust washer are a dependable and consistent friction and wear pattern as well as a fine surface finish.



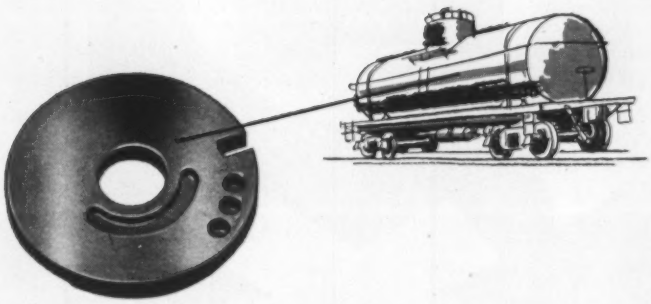
TAPE RECORDER SPINDLE

One of the important requisites in a tape recorder is a low noise level. United States Graphite Company engineers developed a special alloy to meet these requirements in the GRAMIX spindle.



GUIDE BEARING

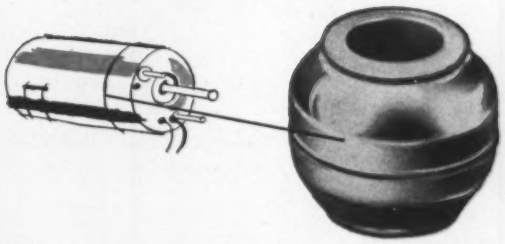
Built-in lubrication and low friction to reduce heat are important features of the GRAMIX alloy chosen for this guide bearing.



LIQUID PUMP END PLATE

This end plate is typical of many parts employed in liquid pumps of many types.

It is made from a wear resistant bronze alloy that was developed for pump applications.



FRACTIONAL H.P. MOTOR

The GRAMIX bearing for this Fractional h.p. motor was developed from a special low noise level alloy.

Its self-lubricating properties were also an important consideration in specifying GRAMIX.

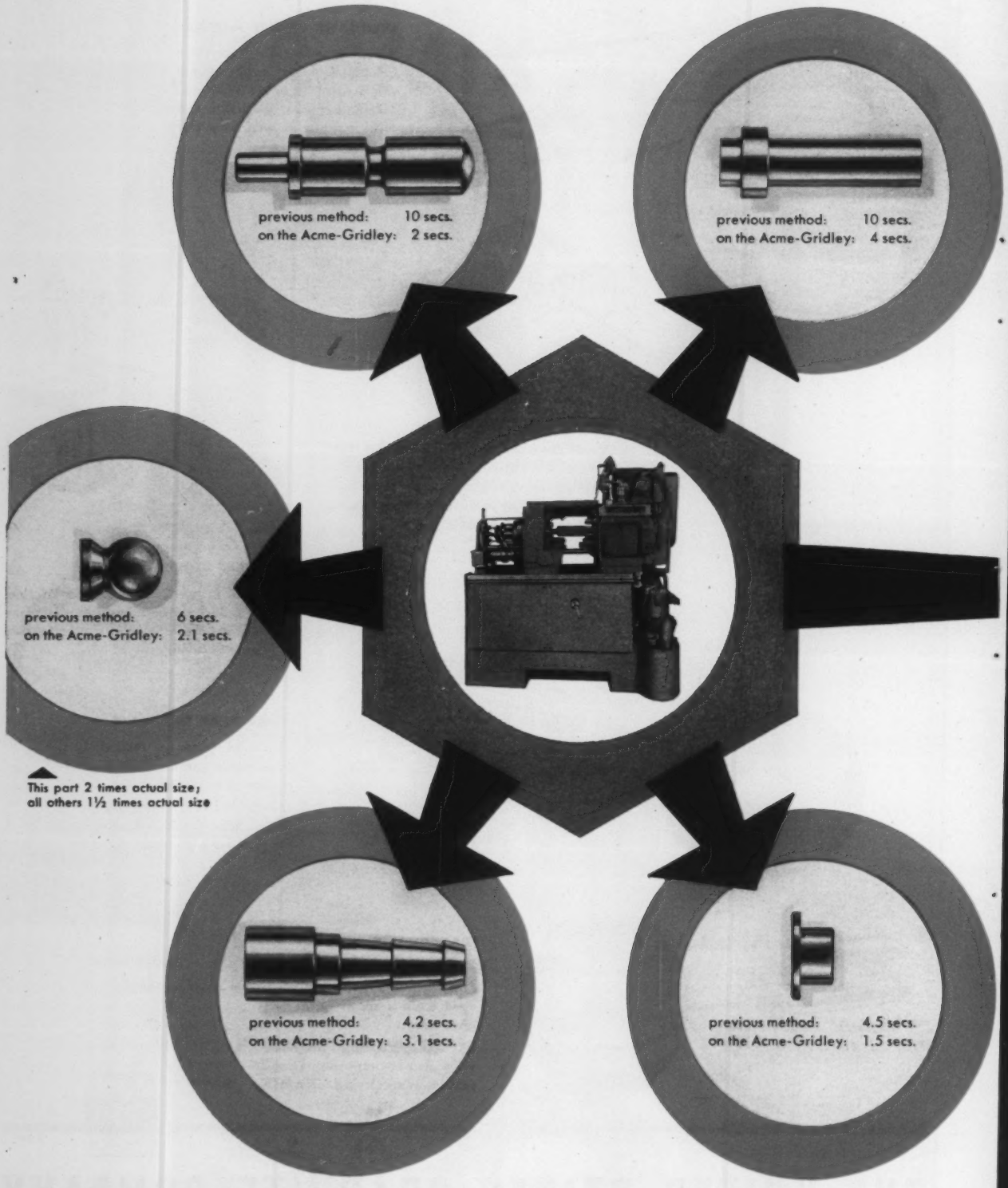
METAL POWDER mpi INDUSTRIES FEDERATION

X-296-2

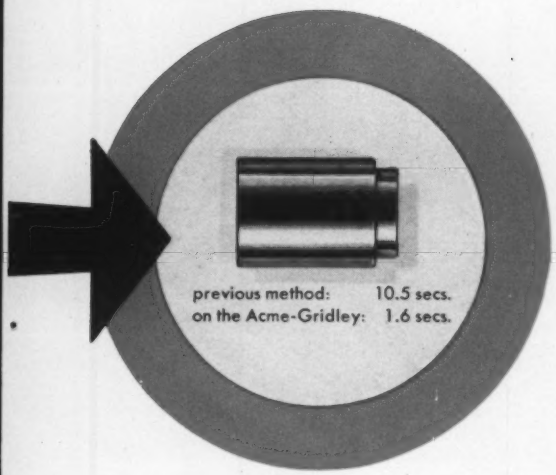
THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 18, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® POWDER METALLURGY • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES


previous method: 10 secs.
on the Acme-Gridley: 2 secs.
previous method: 10 secs.
on the Acme-Gridley: 4 secs.
previous method: 6 secs.
on the Acme-Gridley: 2.1 secs.
This part 2 times actual size; all others 1½ times actual size
previous method: 4.2 secs.
on the Acme-Gridley: 3.1 secs.
previous method: 4.5 secs.
on the Acme-Gridley: 1.5 secs.

ACME-GRIDLEYS SLASH AVERAGE MACHINE TIME 68%...

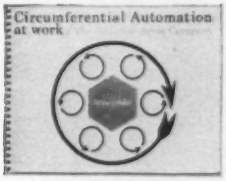


Pay off in profitable new business for screw machine job shop...

Before installing three Acme-Gridley 7/16" RA-6 Spindle Automatics, Carleton Screw Products Co. of Minneapolis found it difficult to keep pace with the demand for greater precision and quality required by current manufacturing standards. Consequently, high costs resulting from slow production methods made Carleton less competitive on short run, small part jobs.

With Acme-Gridleys, it's a different story. Short run, small part jobs are Carleton's bread and butter. The Acme-Gridleys cut average machine time 68% and always produce precision parts that surpass customer specs . . . giving a big boost to Carleton's "repeat order" business.

The 7/16" was *designed* for top economy in the mass production of miniature and sub-miniature parts. It's compact, rugged and has the versatility to handle an amazing variety of jobs. In your shop . . . for years to come . . . it will pay off in lower costs and higher earnings.



The number of *different* jobs that can be set up on any Acme-Gridley amazes everyone. To give you some idea, we've described some 57 actual jobs in a new 64 page bulletin called "Circumferential Automation at Work". For your free copy, call, write or wire.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

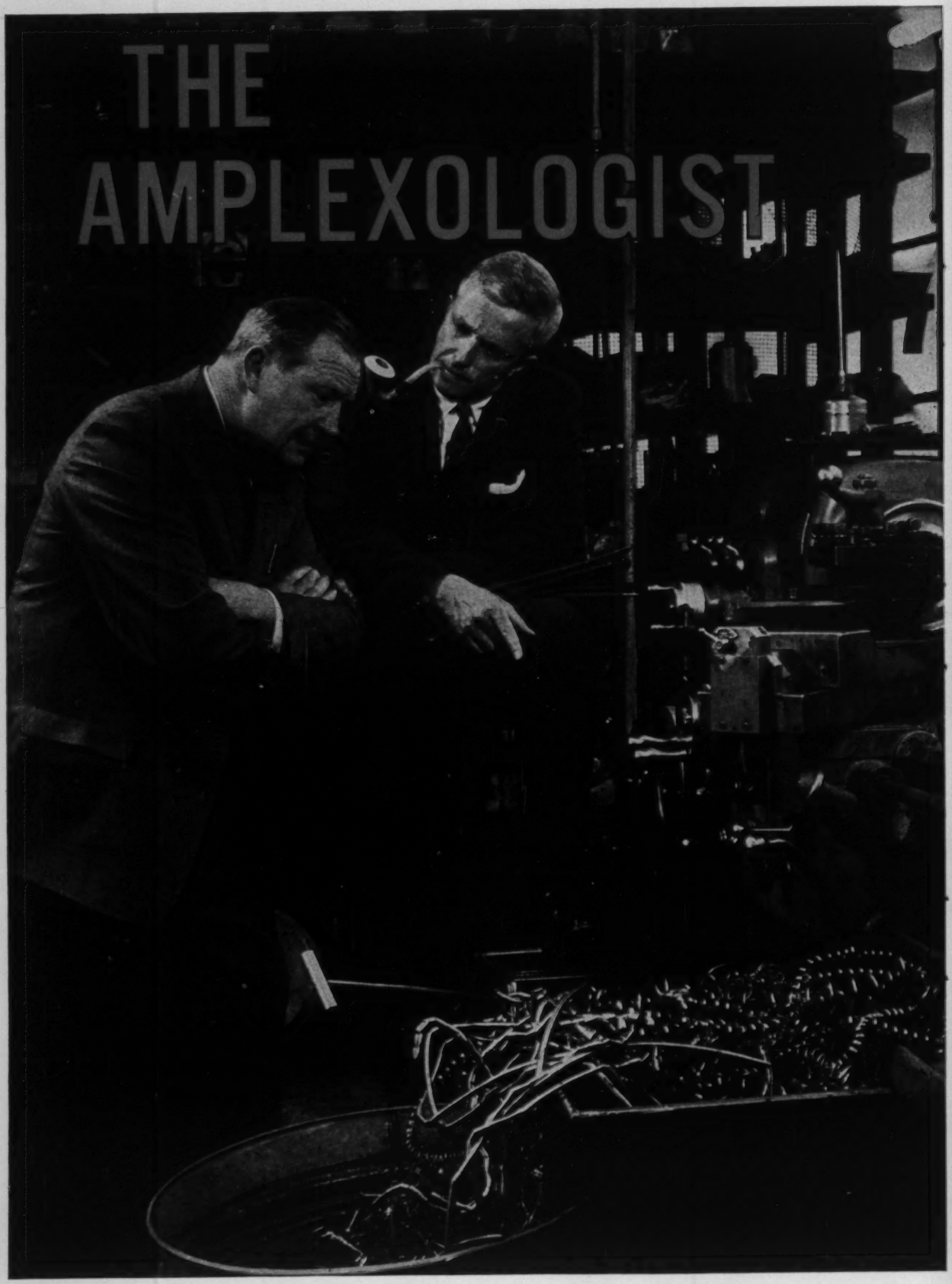
is there
a
Skeptic
in
your
tool room
?

There is a totally new grinding wheel so genuinely good that you'll want no one but your tool room skeptic—the man *least* likely to be impressed—to make the test.

Set up on one of the super-hard tool steels, or on a rugged circular-form grinding job. Together you will experience the rare pleasure of discovering something entirely new and honestly superior: a wheel with the staying power to grind farther and faster than any other you have known.

The wheel to specify is Carborundum's PA-V40 (the initials PA stand for a totally new abrasive grain). To arrange an immediate test, simply call your Carborundum distributor or factory representative.

CARBORUNDUM


THE
AMPLEXOLOGIST

....STARTS FROM SCRAP

One thing about a scrap pile. You can walk around it. But you can't talk it away. That's why the Amplexologist—especially when he's calling on a manufacturer who knows little about powder metallurgy and cares less—often asks:

How much does it cost you to make this scrap?

Loaded question? Sure. Sometimes shakes a man up a little, too. Which is good: makes him more receptive to the word. Namely: advanced powder metallurgy uses only as much material as is necessary to produce a finished, precision part; a part which requires no machining and often costs no more than a rough casting. Eliminates waste material; eliminates the cost of *making* the waste. Often improves the product, too.

Well, once the message gets through—*m-o-n-e-y*—most manufacturers are eager for applications. Like, noon yesterday. Their enthusiasm for cutting out the scrap has helped make us the world's largest and most experienced producer of powder metal parts. Another reason leading manufacturers say: **When it comes to powder metallurgy, Amplex has the answer.**

STARTING FROM SCRAP . . .

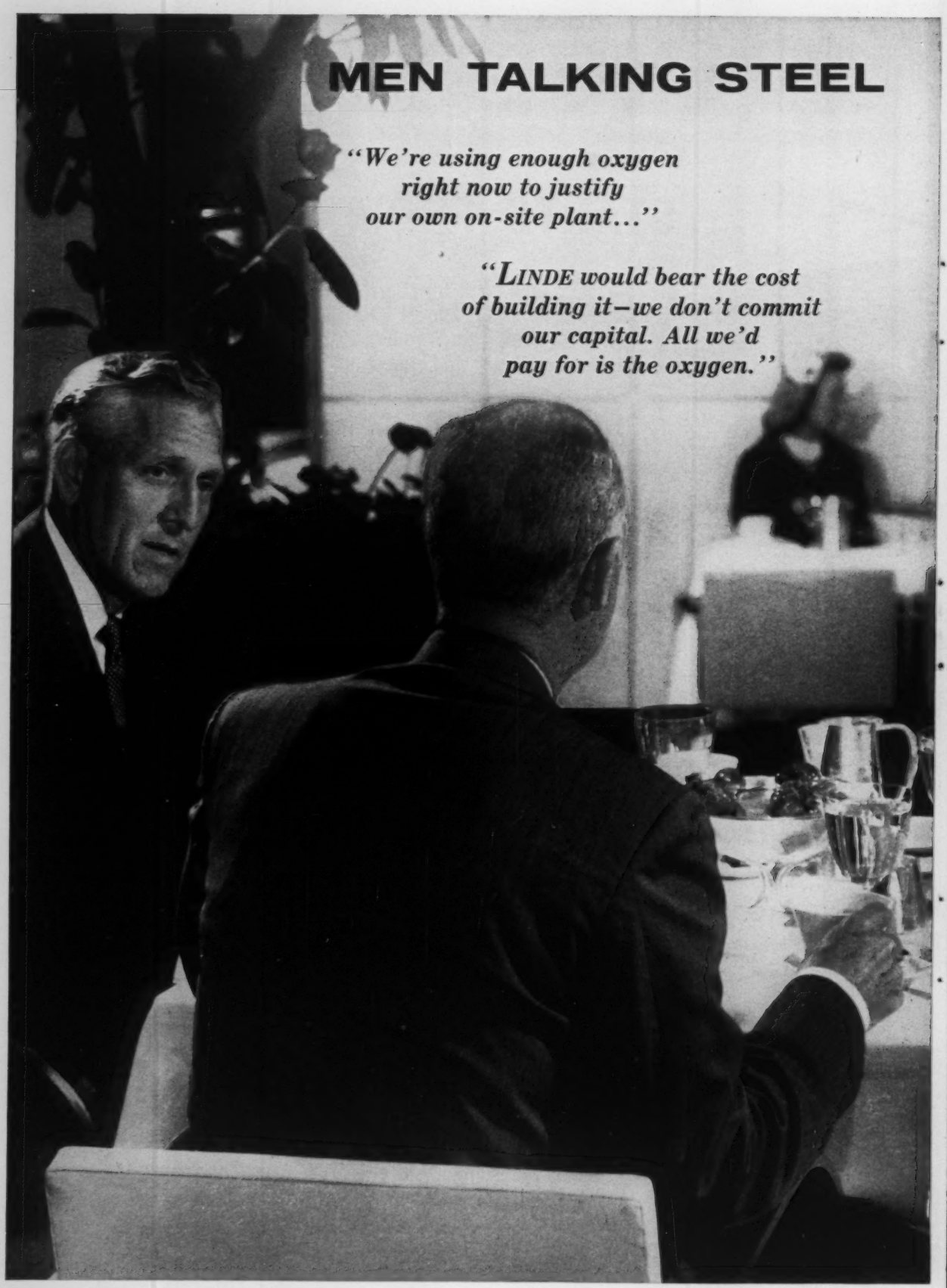
The part shown is a magnet body for an electro-magnetic clutch. Because of the required magnetic properties, uniform wall density is highly critical. Previously, therefore, it was necessary to machine the entire part. The Amplexologist, however, designed it to be produced as a finished, precision powder metal part which requires no machining; and through advanced density control held specified magnetic properties, even in the counterbore. *Approximate saving, 94%.*

AMPLEXOLOGIST

AMPLEX

DIVISION CHRYSLER CORP., DETROIT 31, MICHIGAN

A CHRYSLER OILITE PRODUCT


MEN TALKING STEEL
"We're using enough oxygen right now to justify our own on-site plant..."
"LINDE would bear the cost of building it—we don't commit our capital. All we'd pay for is the oxygen."

ARE TALKING LINDE OXYGEN

"With several times the back-up capacity of anyone else, LINDE can always meet emergency calls too."

"More reasonable than I expected."

To get the full set of facts on how LINDE applies *total gas technology* to on-site plants for the steel industry, write Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada*, Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

LINDE COMPANY

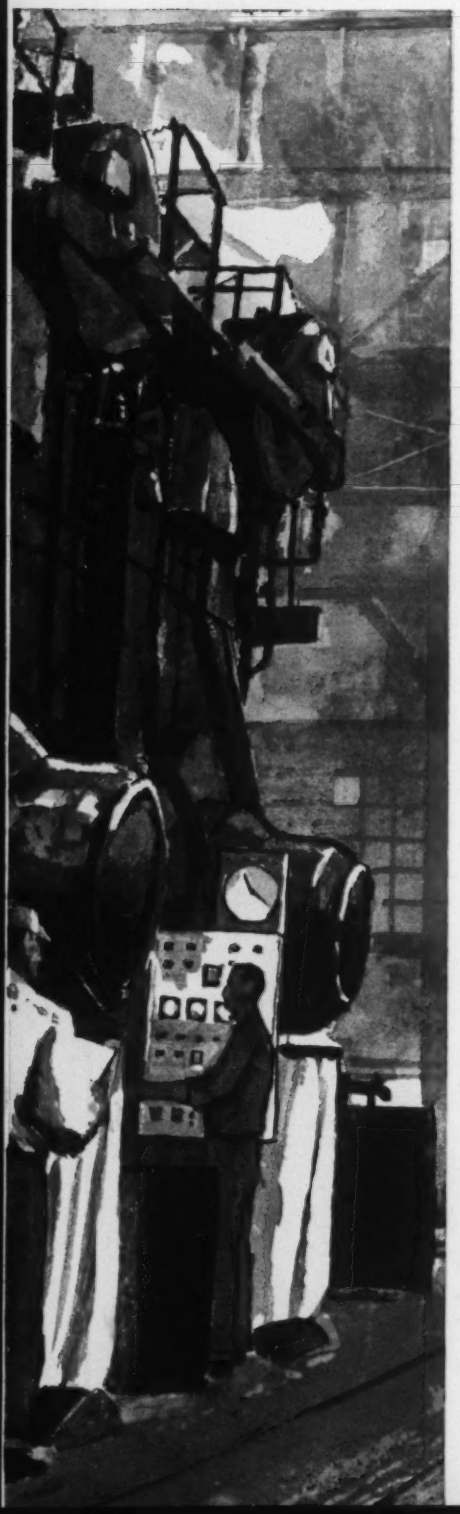
UNION CARBIDE

"Linde" and "Union Carbide" are registered trade marks of Union Carbide Corporation

FOR QUALITY... PRODUCTIVITY... PROFIT
METAL ROLLING
AUTOMATED BY GENERAL ELECTRIC

More steel producers to keep strip on-gage

turn to General Electric gage control automatically, increase yield per ton



To maintain strip gage . . . increasing output of saleable product . . . more and more steelmakers are using General Electric automatic gage controls. G-E gage control systems to be delivered in 1961 are equal in number to all automatic systems supplied since the first installation in 1955 . . . bringing to nearly 50 the number of General Electric designed systems in operation. Automatic gage control is another of many products and systems General Electric has pioneered in 75 years of developing and building equipment to help make metal rolling faster, more efficient, and more profitable.

Two automatic gage control systems . . . a cold-mill system first applied in 1955, and a hot-mill system successfully applied in 1958 . . . result in greater yield of usable strip per ton while reducing costly downtime resulting from less-efficient manual adjustment systems. Look at the benefits in these two key areas:

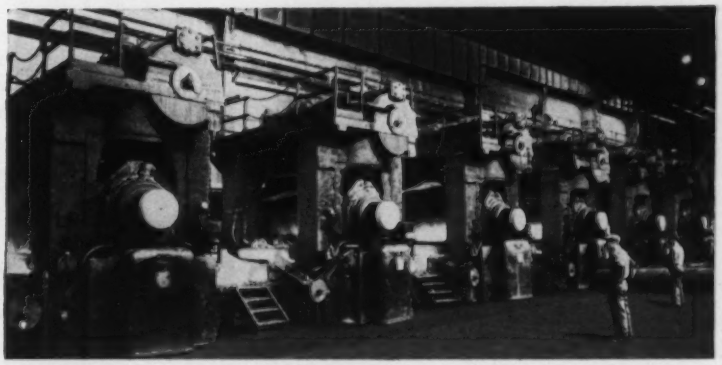
Higher quality strip—more uniform strip throughout because off-gage signal automatically activates corrective equipment . . . strip gets on-gage sooner, stays on-gage longer . . . more usable strip per ton.

Maintenance and downtime reduced—long-life, solid-state semi-conductors with no moving parts are used . . . "plug-in, plug-out" replacement of faulted parts permits full production during repair.

Let General Electric's experience in steel mill control, and leadership in automating all types of process control, help you in your modernization program or in your plans for new facilities. See your General Electric sales representative. For more details on gage control, write Sect. 785-14, General Electric Co., Schenectady, N. Y. *Industry Control Department, Salem, Virginia.*

Progress Is Our Most Important Product

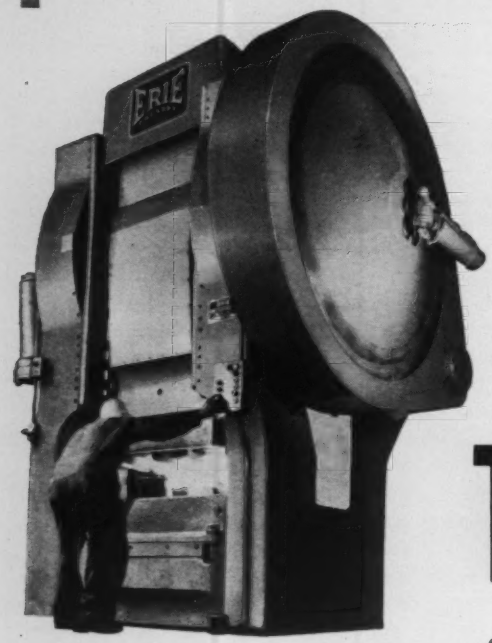
GENERAL ELECTRIC



AUTOMATIC GAGE CONTROL for either hot-strip mills (above) or cold-strip mills is just one of many automated systems designed and built by General Electric to help you meet increasing competition.

WANT TO AUTOMATE YOUR FORGING OPERATION?

You set your production goal . . .



ERIE WILL BUILD THE PRESS

Set your sights on higher output . . . Erie Foundry makes it possible to achieve it, with a high-volume automated forging press. As the first company to automate forging, Erie specializes in custom-designing and building automated presses in capacities up to 8,000 tons.

A single Erie-built automated press, with only one operator-observer, can actually triple your present production rate equalling the output of three regular forging presses and nine production men!

Trimming, too, can be accomplished in a single production cycle. With billet supply and finished part removal conveyorized you can achieve a production volume of, say, 1200 track-link forgings per hour.

To meet your specific needs, Erie Foundry will design a machine for high volume production of such parts as connecting rods, gear blanks, automotive and tractor valves, pinions, track links and wheel hubs.

For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 1, Pa.

ERIE

ERIE FOUNDRY COMPANY SINCE 1895

ONE OF THE GREAT NAMES IN FORGING

EF-60-03

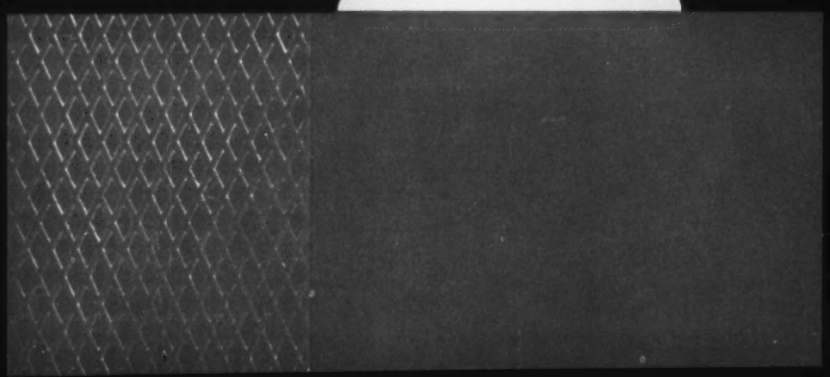
Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

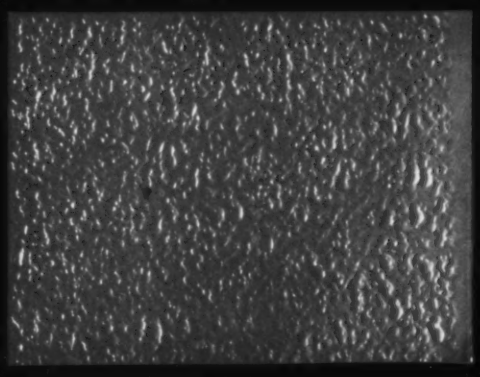
J-8082

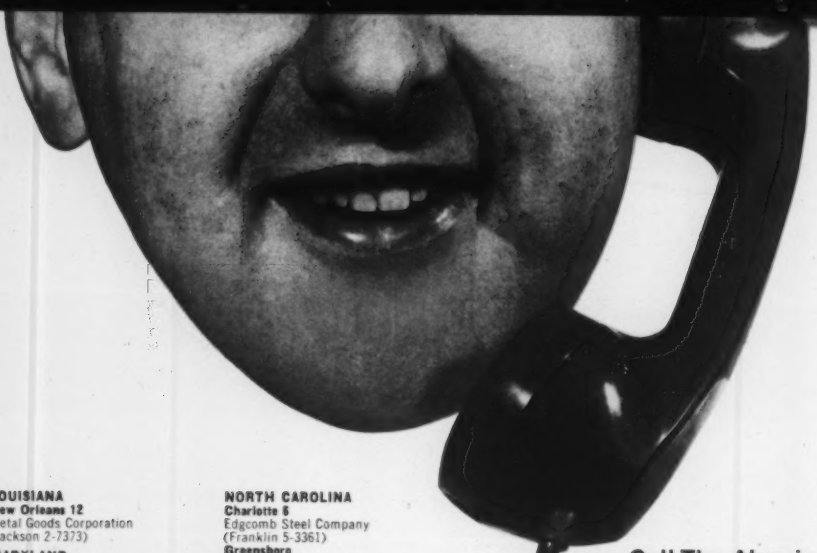
Widest Range from Any Distributor Source. Calling on your local Alcoa distributor for aluminum in all its forms is like having an Alcoa plant next door. Nobody else stocks as much sheet and plate; wire, rod and bar; tube and pipe; and extruded shapes in as many sizes, alloys and finishes. Nobody else can respond as quickly to your call for metal or technical advice.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY







ALABAMA
Birmingham 5
Hinkle Supply Company, Inc.
(Fairfax 2-4541)
The J. M. Tull Metal & Supply Co., Inc.
(Fairfax 3-1612)

ARIZONA
Phoenix
Ducommun Metals & Supply Co.
(Bridge 5-4471)
Pacific Metals Company, Ltd.
(Alpine 8-7821)

CALIFORNIA
Berkeley 10
Ducommun Metals & Supply Co.
(Thornwall 1-1820)
Los Angeles 58
Benjamin Metals Company
(Rod & Bar) (Nevada 6-0611)
Los Angeles 54
Ducommun Metals & Supply Co.
(Ludlow 8-0161)
Los Angeles 22
Pacific Metals Company, Ltd.
(Raymond 3-5431)
Los Angeles 22
Tubesales (Tube & Pipe)
(Raymond 3-7781)
San Diego
Ducommun Metals & Supply Co.
(Gridley 7-3141)
San Diego 1
Pacific Metals Company, Ltd.
(Belmont 4-3253)
San Francisco 7
Pacific Metals Company, Ltd.
(Underhill 3-5600)

COLORADO
Denver 16
Marsh Steel & Aluminum Co.
(Keystone 4-1241)
Denver 16
Metal Goods Corporation
(Dudley 8-4141)

CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.
(Trinity 4-1631)
Windsor
Whitehead Metals, Inc.
(Murdock 8-4921)

FLORIDA
Jacksonville 5
The J. M. Tull Metal & Supply Co., Inc.
(Evergreen 7-5561)
Miami
The J. M. Tull Metal & Supply Co., Inc.
(Oxford 6-0150)
Tampa 10
The J. M. Tull Metal & Supply Co., Inc.
(3-6741)

GEORGIA
Atlanta 2
The J. M. Tull Metal & Supply Co., Inc.
(Jackson 5-3871)

HAWAII
Honolulu 14
Aluminum Products Hawaii, Ltd.
(94-861)

IDAHO
Boise
Pacific Metal Company (3-6468)

ILLINOIS
Chicago 80
Central Steel and Wire Company
(Republic 7-3000)
Chicago 80
The Corey Steel Company
(Bishop 2-3000)
Chicago 23
Steel Sales Corporation
(Bishop 7-7700)

INDIANA
Indianapolis 18
Steel Sales Co. of Indiana, Inc.
(Liberty 6-1535)

KANSAS
Wichita
Marsh Steel & Aluminum Co.
(Whitehall 2-3231)

KENTUCKY
Louisville 3
Williams and Company, Incorporated
(Juniper 3-7781)

LOUISIANA
New Orleans 12
Metal Goods Corporation
(Jackson 2-7373)

MARYLAND
Baltimore 7
Whitehead Metals, Inc.
(Windsor 4-2000)

MASSACHUSETTS
Cambridge 39
Whitehead Metals, Inc.
(Trowbridge 6-4680)
Roxbury
Eastern Metal Mill Products Company
(Highlands 2-5900)

MICHIGAN
Detroit 12
Central Steel and Wire Company
(Twinbrook 2-3200)
Detroit (Hazel Park)
Meier Brass & Aluminum Co.
(Jordan 6-3902)
Detroit 10
Steel Sales Co. of Michigan
(Tyler 6-3000)

MINNESOTA
Minneapolis 13
Steel Sales Co. of Minnesota
(Sterling 1-4893)

MISSOURI
North Kansas City 16
Marsh Steel & Aluminum Co.
(Grand 1-3505)
North Kansas City 16
Metal Goods Corporation
(Grand 1-3516)
St. Louis 14
Metal Goods Corporation
(Harrison 7-1234)
St. Louis 10
Steel Sales Co. of Missouri, Inc.
(Prospect 1-5255)

NEW HAMPSHIRE
Nashua
Edgcomb Steel of New England, Inc.
(Tuxedo 3-7731)

NEW JERSEY
Elizabeth
Adam Metal Supply of New Jersey
(Flanders 1-2550)
Englewood
Tubesales (Tube & Pipe)
(Lowell 7-4400)
Harrison
Whitehead Metals, Inc.
(Humbolt 5-5900)
Hillside 5
Miller Steel and Aluminum
Division of Robert Campbell Co., Inc.
(Waverly 6-6000)

NEW YORK
Albany 1
Eastern Metals Warehouse, Inc.
(IV 9-3281)
Buffalo 17
Brace-Mueller-Huntley, Inc.
(TR 7-8700)
Buffalo 7
Whitehead Metals, Inc.
(TR 6-3100)
New York (Long Island City 1)
Adam Metal Supply, Inc.
(Stillwell 6-7737)
New York (Brooklyn)
Straits Aluminum Company, Inc.
(Browning 2-7000)
New York 14
Whitehead Metals, Inc.
(Watkins 4-1500)
Rochester 5
Adam Metal Supply of Rochester
(Locust 2-4260)
Rochester 1
Brace-Mueller-Huntley, Inc.
(Congress 6-6560)
Rochester 10
Whitehead Metals, Inc.
(Butler 8-2141)
Syracuse 1
Brace-Mueller-Huntley, Inc.
(Howard 3-3341)
Syracuse 1
Whitehead Metals, Inc.
(Howard 3-6241)

NORTH CAROLINA
Charlotte 6
Edgcomb Steel Company
(Franklin 5-3361)
Greensboro
Edgcomb Steel Company
(Broadway 5-8421)

OHIO
Cincinnati 14
Central Steel and Wire Company
(Avon 1-2230)
Cincinnati 37
Williams and Company, Incorporated
(Valley 1-5555)
Cleveland 28
A. M. Castle & Co.
(Axminster 2-7600)
Cleveland 14
Williams and Company, Incorporated
(Utah 1-5000)
Columbus 12
Williams and Company, Incorporated
(Axminster 4-1623)
Toledo 12
Williams and Company, Incorporated
(Greenwood 5-8661)

OKLAHOMA
Tulsa 13
Metal Goods Corporation
(Temple 6-2561)

OREGON
Portland 9
Pacific Metal Company
(Capitol 7-0693)

PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
(Cedar 1-8600)
York
Edgcomb Steel Company (47-1931)

RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
(Poplar 7-0900)

SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc.
(Cedar 3-8366)

TENNESSEE
Memphis 6
Metal Goods Corporation
(Whitehall 8-3407)

TEXAS
Dallas
McCormick Steel Company
(CH 7-3104)
Dallas 35
Metal Goods Corporation
(Fleetwood 1-3271)
Houston 1
McCormick Steel Company
(OR 2-6671)
Houston 1
Metal Goods Corporation
(Riverside 7-1110)

UTAH
Salt Lake City 1
Pacific Metals Company, Ltd.
(Davis 2-3461)

WASHINGTON
Seattle 8
Ducommun Metals & Supply Co.
(Parkway 5-1500)
Seattle 4
Pacific Metal Company (Main 2-6925)
Spokane 4
Pacific Metal Company
(Keystone 5-3681)

WISCONSIN
Milwaukee 1
Central Steel and Wire Company
(Humboldt 1-5000)
Milwaukee 9
Steel Sales Co. of Wisconsin
(Hilltop 2-2020)

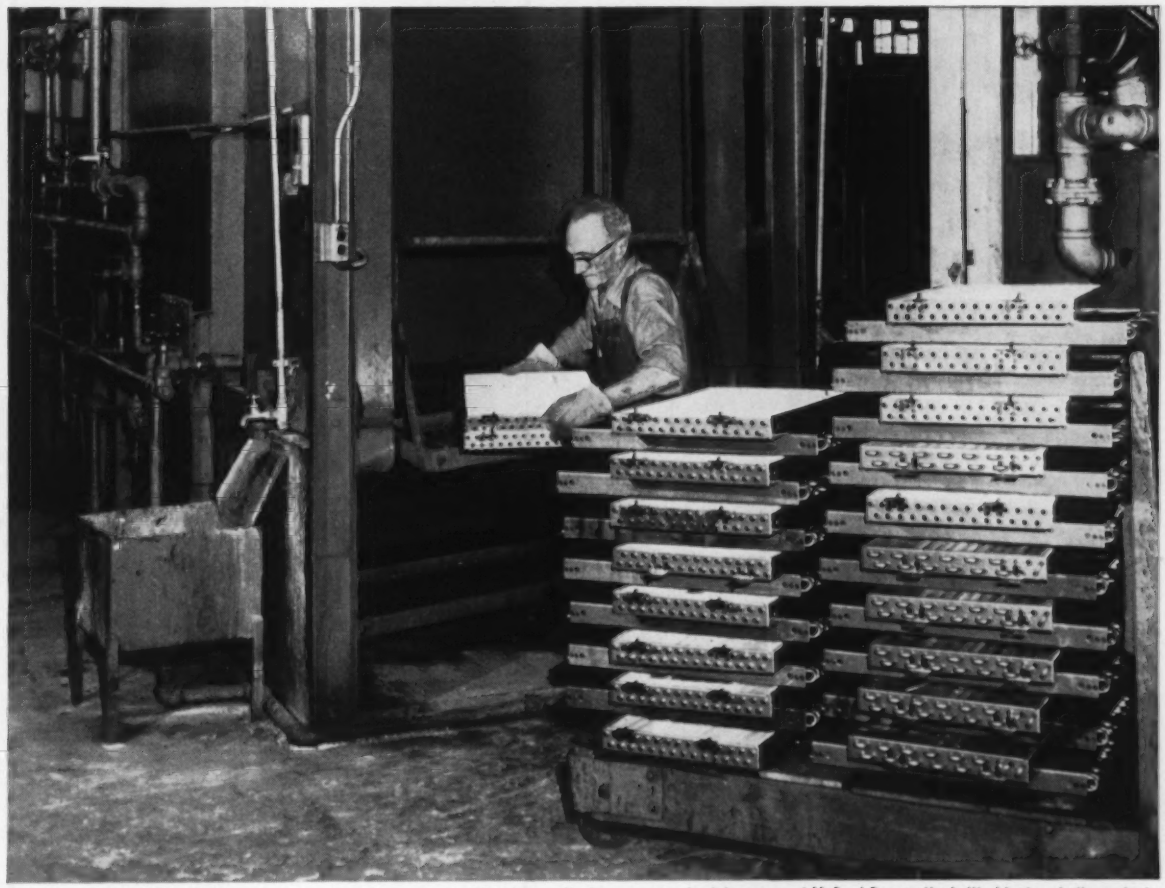
Call The Aluminum Man . . . his stock's the most complete!

Your Alcoa distributor sales representative—*The Aluminum Man*—maintains a warehouse bulging with sheet and plate; tube and pipe; extruded shapes; wire, rod and bar. His stock represents the widest range of aluminum products available from any distributor source. He can arrange for them to be slit, sawed or sheared to your specifications—furnish technical advice you may need on alloy selection and fabrication techniques. He's your fastest supply line for aluminum in any form when you need it. Your nearest Alcoa distributor is listed on this page, so give him a call . . . soon. Aluminum Company of America, 845-F Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY

Call *The Aluminum Man* . . . he's your Alcoa distributor sales representative



At the end of a Nialk TRICHLOR vapor degreasing cycle, operator lifts clean units from conveyorized degreaser at McCord Corporation's Washington, Indiana plant.

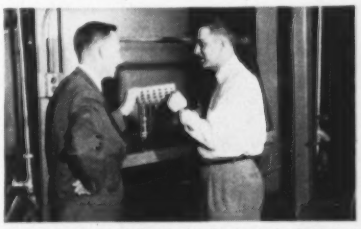
HOW McCORD DEGREASES 57,000 PARTS BETWEEN CLEANOUTS

Oil, grease, and metal chips clinging to condenser and evaporator units create a complex cleaning problem for McCord Corporation.

Yet McCord degreases 57,000 units with Nialk® TRICHLOR-ethylene before cleanout.

The bath doesn't go acid, even with metal chips in it. That's because the stabilizer has *psp*—permanent staying power. In more than five years of degreasing with Nialk TRICHLOR, McCord has never had to titrate or make any similar test.

"I don't see how you could find anything more appropriate to our type of operation," says Frank McDonald, plant foreman. "Nialk TRICHLOR is fast and efficient."



Ray B. Preston (left) of the P. B. & S. Chemical Company, the local Nialk TRICHLORethylene distributor, and McCord Corporation's plant manager, John C. Padden, discuss critical cleaning requirements.

Besides being pleased with the large volume of material degreased between cleanouts, Mr. McDonald has found "the help of the Hooker people in the operation of our degreaser of great benefit to us."

Whatever your metal, whatever your degreasing job, you can solve your cleaning problem with Nialk TRICHLOR. See your chemical distributor or drop us a line. Hooker experience is yours for the asking.

HOOKER CHEMICAL CORPORATION

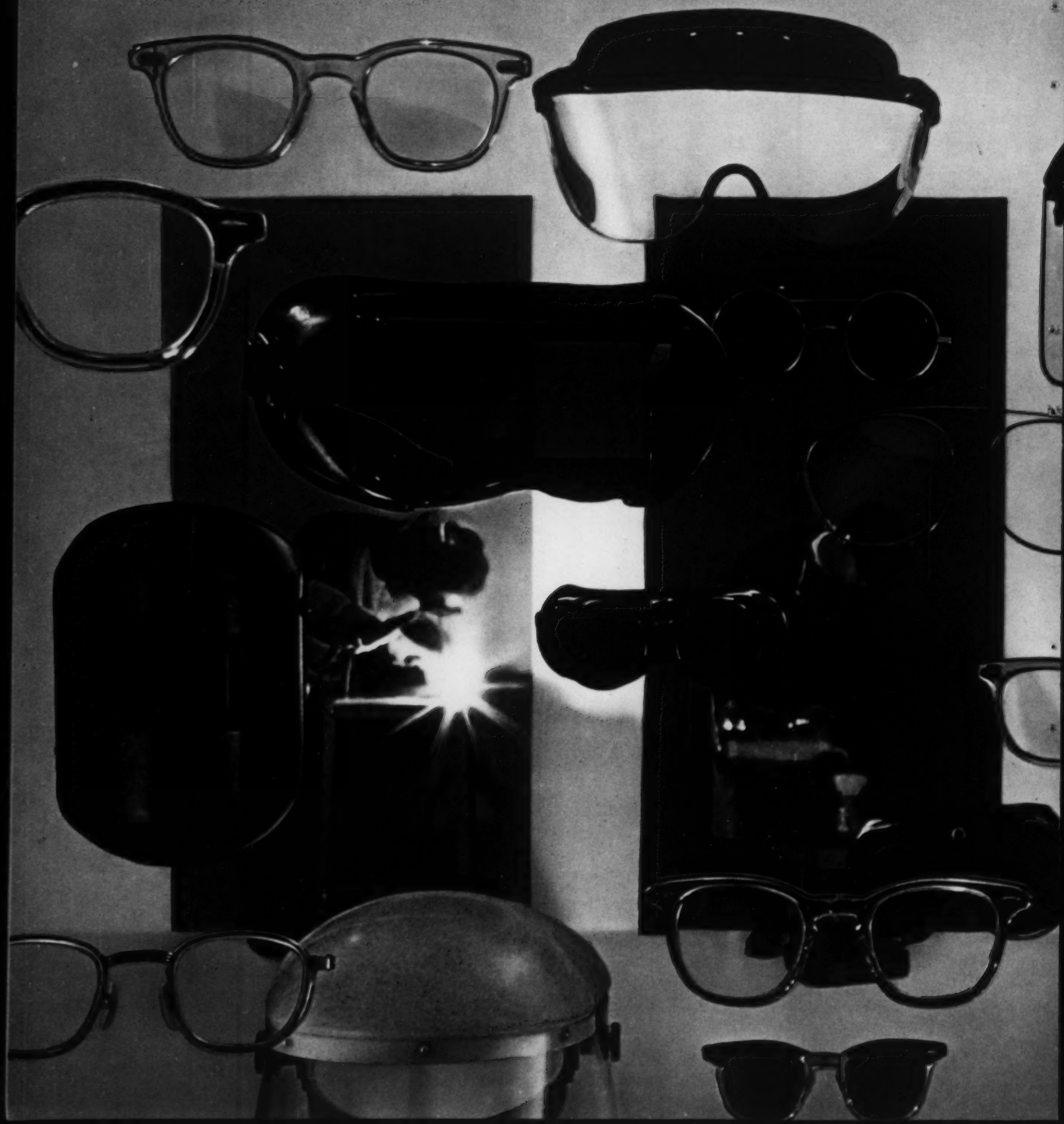
1206 UNION STREET, NIAGARA FALLS, NEW YORK

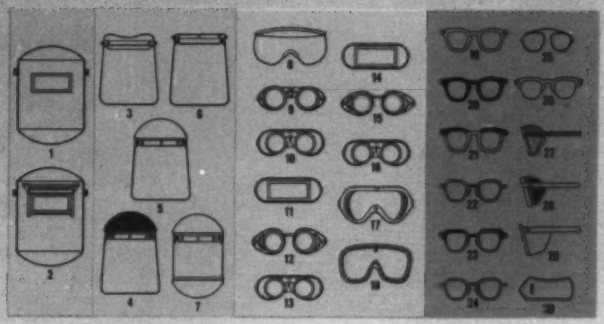
HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

THE LOGIC OF PLACING YOUR SAFETY EYEWEAR BUSINESS WITH THE MAN FROM MSA: enough styles, enough optional features to satisfy the whim of any wearer. *We'd like to help you win your worker's full-time acceptance of eye and face protection. It shows through in the sheer weight of numbers we offer the wearer to choose from. You see it again in the smart, trim lines of the styling. It's visible too in our ability to match the right equipment to the right job. Add to this big picture approach a complete vision program, including Rx service. And there you have it. A truly complete package. That's why it's so logical to place your safety eyewear business with the Man from MSA.*

MINE SAFETY APPLIANCES COMPANY, Pittsburgh 8, Pennsylvania MSA





M-S-A Welding Helmets

1. Full Curve Fixed Front
2. Full Curve Lift Front

M-S-A Faceshields

3. Minigard
4. Super-Gard
5. Facegard with Sparkgard
6. Facegard without Sparkgard
7. Nitrometer Mask

M-S-A Goggles

8. Jones Visor Goggles
9. Metal Frame Flash Goggles
10. Comfo Chippers' Goggles
11. Clearvue Chippers' Goggles
12. Chippers' Cup Goggles
13. Chippers' Cover Goggles
14. Clearvue Welders' Goggles
15. Welders' Cup Goggles
16. Welders' Cover Goggles
17. Rubber Frame Goggles
18. Soft Sides Goggles

M-S-A Sightgard Spectacles

19. Flesh Acetate
20. Ebony Acetate
21. Ebony-On-Crystal Acetate
22. Metal
23. Acetate-On-Metal
24. Smoke with Aluminum Temples
25. Metal "Clip-Ons"
26. Visitors' Spectacles

With Side Shields

27. Perforated Acetate Side Shield
28. Wire Mesh With Acetate Edge Side Shield
29. Solid Acetate Temple-Mounted Half Shield

M-S-A Open End Case With Pocket Clip

30. (Wide range of MSA cases available)

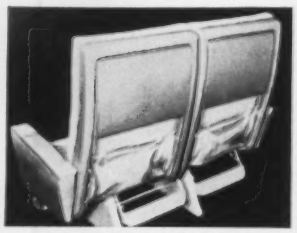
For United Air Lines' Jets,

3M ADHESIVE'S "INSTANT" BOND STRENGTH PUTS SCULPTURED SEATS TOGETHER—FAST!

3M Brand Adhesive EC-1357 builds high bond strength practically instantaneously between leather covering and aluminum frames so that the leather can be immediately formed to the special sculptured design of the seats for United Air Lines' jets. As a result, Aerotherm Division of Aerotec Industries Inc., Bantam, Conn., has achieved production-line speed and economy in making the seats.

In production, EC-1357 is applied to aluminum back and side frames up to a week before actual bonding, then solvent-reactivated, for flexible scheduling. Areas of pre-cut leather are brush-coated with EC-1357; the leather is thoroughly soaked; adhesive surfaces are wiped free of water, and a second coat of EC-1357 is applied. Production line fixtures then apply pressure to the leather-to-aluminum bonds, and because of rapid strength build-up, the leather can be immediately pulled into proper contour.

How can 3M adhesives speed your production? EC-1357 is one of hundreds of adhesives developed by 3M research to solve industrial fastening, coating and sealing problems. Call the nearby 3M Field Engineer. Or write AC&S Division, 3M Co., Dept. SBEE-61, St. Paul 6, Minn.



Fast strength build-up of 3M Brand Adhesive EC-1357 permits immediate form-fitting of leather after it's bonded to aluminum seat frame.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

SPECIAL REPORT

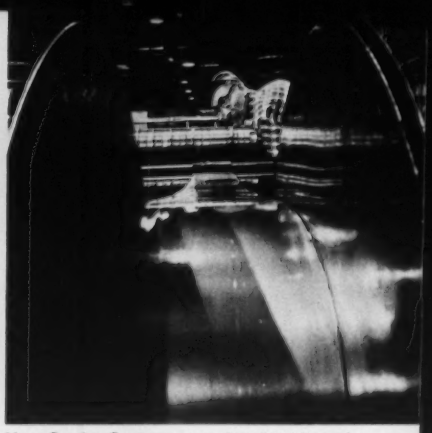
from United States Steel

HOW TO FEED A GIANT

turn page for the story

Steel is stocked for fast delivery . . . day and night.

This multiple-head flame cutting operation saves customer investments in equipment.



Many Service Centers are equipped to trim and slit coils of steel sheet.

STEEL SERVICE CENTER INSTITUTE

Look what the "iron room" started

The call came at 7:00 P.M., halfway through the Steel Service Center Manager's dessert course. The voice on the other end belonged to a local steel fabricator, and there was an edge of panic in it. A mill shipment of steel had been stalled on the road by a storm. He had 38 men on his production line turning out a critical defense order, and he was running out of steel. He needed 5,000# of cut-to-size hot rolled steel sheets by midnight to keep the line running. The manager hung up and immediately dialed his stock supervisor, who was sure they had the right thickness in stock. Fortunately, it was company bowling night and the stock man, shear operator, crane operator and a truck driver were all in one place. The manager drove by the bowling alley, picked them up and they were off to work. By 11:00 P.M. the sheared-to-size sheets were loaded on the truck. By 11:45 they were on the fabricator's production line.

This scene could have happened in any one of hundreds of what are called Steel Service Centers. A scant fifty years ago, when the steel industry itself was in its infancy, they were known as "iron rooms." There were just a couple hundred in the entire country and they were usually located to the rear of a hardware store or harness shop. It was where you went if you needed any of the few iron shapes that were available in that bygone era. If you could pluck an iron room proprietor out of the past and introduce him to a modern Steel Service Center, he would not believe his eyes.

Most awesome of all, he would see incredible stocks of *thousands* of steel items: plates, sheets, bars, structurals, strip and dozens of other steel products in a nearly endless range of sizes and chemical analyses. He would see complex equipment handling the steel as if it were feather light. He would see more equipment than he ever saw in a factory of his day. And he would be totally mystified by the computers and accounting systems that keep track of it all.

In short, he would see one of modern business's most efficient distribution systems, a vast network of 1400 Steel Service Centers who take over where mill shipments of steel leave off. Nearly a half a million small steel users buy *all* their steel from Steel Service Centers, and every manufacturer buys at least part of his steel from them. A *fifth* of all the steel produced in the U.S.A. passes through Steel Service Centers and other types of steel distributors. Here's why:

Profile of a giant. To understand what a Steel Service Center is and why its role is increasingly vital to the health of modern manufacturing, you have only to look at the personality of their market, the metalworking "giant." It is made up of thousands of steel fabricating firms who will consume millions of tons of steel this year. About 80% of that steel will be shipped in full carload and truckload quantities directly from steel mills to fabricator customers. Thousands of small steel users couldn't stay in business if Steel Service Centers weren't on the scene to distribute the remaining 20%, and to provide the remarkable services they do today. And thousands of large steel users need Steel Service Centers to maintain efficiency.

The production line is the lifeblood of the metalworking giant. It chews up mill shipments of steel by the carload, and it works only as long as it is being fed. But gaps between mill shipments are inevitable, and that's where the Steel Service Center steps in with immediate delivery of the exact type, size, and quantity of steel needed to keep the line operating.

The problem of the small steel user is just as critical. He requires smaller quantities and frequent, quick deliveries, so he buys where quick deliveries of small quantities are usual business practice—from a Steel Service Center.

Large or small operation, efficiency is the key to survival for a steel fabricator, and here the Steel Service Center plays an increasingly important role. Often the fabricator can't afford to invest in specialized equipment because it would stand idle much of the time, so the Steel Service Center invests in the equipment. Service Centers have equipment that does much of the preliminary work on steel, such as cutting to size, so it can go straight on the production line, and it is done with more efficiency because Service Centers can operate the equipment at higher capacity.

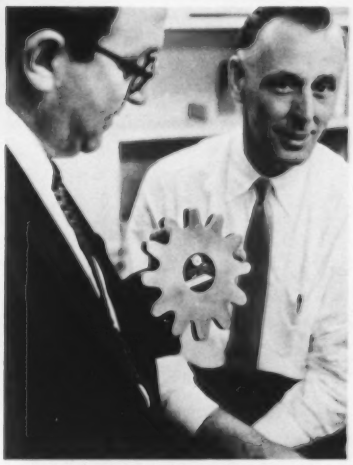
In this day of spiraling wages and costs, Steel Service Centers are showing steel users that often it is cheaper for the users *not* to stock large quantities of steel. They point to costs tied up in inventory space, extra handling, manpower, scrap loss, insurance and taxes. Their message: let us stock your steel for you.

Business can be a circus. Because they're in business to deliver steel when and where it's needed, Steel Service Centers have problems that would leave some logistics experts bug-eyed. A Center in Michigan, for example, has a man-sized IBM computer that hums furiously most of the day keeping track of the more than 20,000 steel items in stock, and trying to outguess the next week's market. Some Centers stock a complete range of steel products, others tailor their stocks to a specialized local market—sometimes to a single industry. But there's hardly any way of knowing what might happen next. The *average* order handled by a large Steel Service Center in Missouri, for example, weighs 1,300# and sells for under $200, but it takes all kinds. One week in March, the Center's biggest order was a whopping 200,000# of mixed small quantities of hot rolled bars, structurals and sheets. That same week, a harried engineer from an airline's

Service Center metallurgist checks contour-sawed parts for dimensional accuracy and hardness.

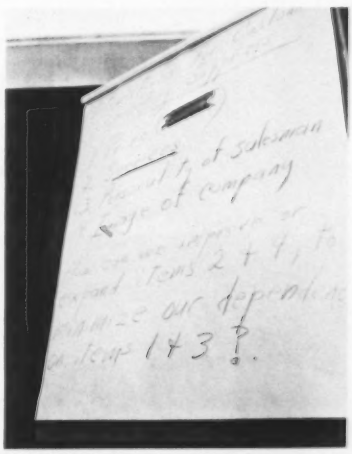
Metallurgy is an important factor in Steel Service Center operations.

This mark tells you a product is made of modern, dependable Steel. Look for it on the products you buy.



This stainless steel gear blank was cut by a unique process developed by a Service Center.

It takes computers to keep pace with today's demands on steel distribution.



And in the executive offices, they're always looking for better ways to serve.

maintenance shop rushed over in a taxi, left the meter running and paid cash on the barrelhead for a single sheet of hot rolled steel. They still talk about the day the circus came to town and the human cannon broke down. The human cannonball himself hightailed it to the Center for a scant 4 inches of ½-inch tubing so that the show could go on.

Emergency is commonplace. To the harried production line superintendent caught with his inventory down, to the steel user who buys steel only in small quantities, to the custom fabricator who has no way of knowing what his steel needs will be next week, the show *must* go on and Steel Service Centers see that it does. Last month, a Massachusetts Service Center found they had exactly 16 hours to locate, cut and deliver 180 pieces of 4150 annealed alloy steel 3½" rounds in lengths from 3/16" to 2 11/16". They got the message late at night and the cut-to-size rounds had to be on a local machine shop operator's lathes by noon the next day to meet an emergency delivery of critical aircraft engine parts. They did not have a pound of the required sizes in stock, but they got on the phones and located everything they needed in a branch Center 40 miles away. After a fast truck trip and a pre-dawn call to the cutting machine operators, the sized steel rounds began to flow into the machine shop and were on the operator's lathes before noon.

They were just beginning to breathe easily when a local housewife wandered in, presented a "grocery" list of steel bars and rods that her do-it-yourselfer husband needed. *Her* emergency, she explained, was that her husband would be furious with her if he didn't have the steel to work on that evening. Although she should have done her shopping in a hardware store, she got her steel and she got it with a smile because the Center believes in Service.

Who says service has disappeared? Millions of American shoppers complain that "service" of years past has vanished. But you don't hear that complaint about Steel Service Centers; here, service has never been better. Service Centers not only do the "impossible" in getting steel where it's needed when it's needed, but they're making sure a full spectrum of fringe services are available, too. Because there are over 10,000 different steels available today, Service Centers make available to their customers extensive metallurgical service so that those customers can be sure the right steel has been selected for the job. And Service Centers are helping their customers with fabricating problems, often suggest cost-cutting design changes, and are providing more efficient ways to deliver steel to customers with more of the preliminary operations already completed. They're endlessly tinkering with new ways to provide service through use of electronic computers and improved handling equipment, like forklifts that *hang* from overhead traveling cranes, that will get steel on its way even faster.

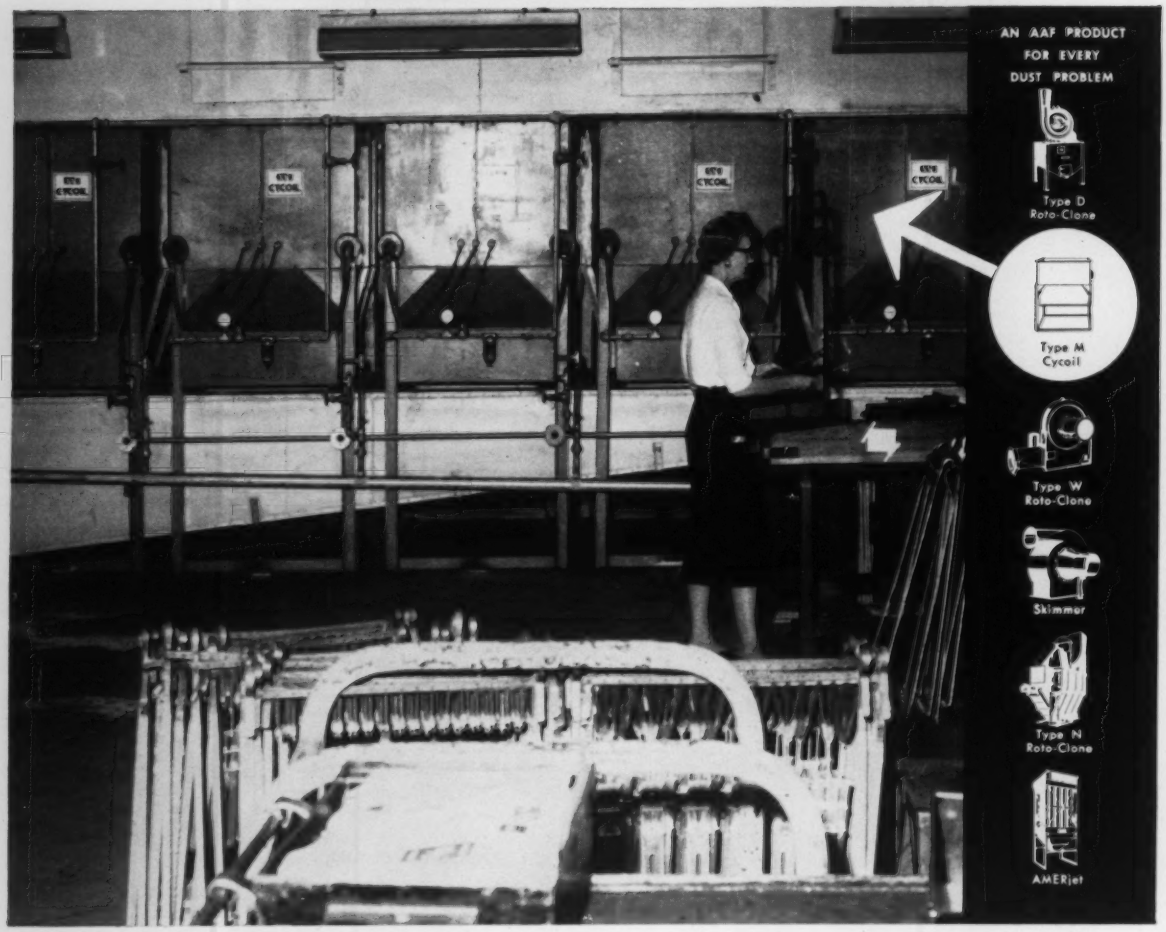
One New Jersey Center developed a method of cutting irregular shapes from heavy stainless steel plate that amazed the experts and pulled inquiries from many design engineers.

Our stake. It all leads us to say that we at United States Steel—producers of the widest range of carbon, high strength, alloy and stainless steel quality products in the industry—are proud of our association with the descendant of the iron room: the Steel Service Center. For years we have demonstrated our interest by actively helping them sell. USS has furnished metallurgical and technical information and assistance to Steel Service Centers for their use in selling steel to *their* customers, and we have traditionally promoted warehouse markets by stimulating greater use of steel. Why? Because of another fact we're proud of: of all the steel sold through Steel Service Centers, more of it is made by United States Steel than by any other producer.

USS United States Steel

TRADEMARK

PLATING



AAF Type M Cycoils eliminate fumes from small parts plating at Burroughs

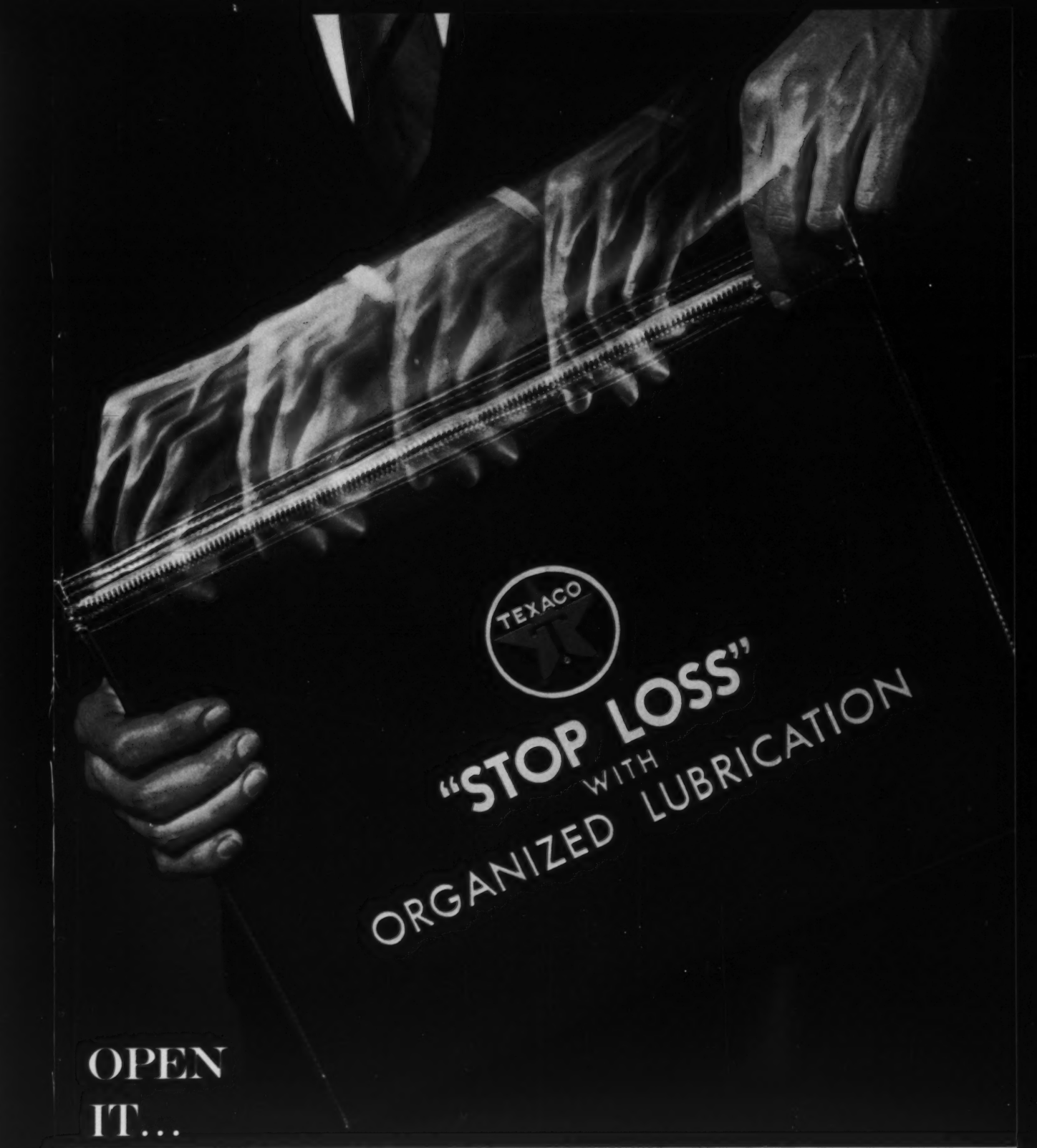
● Burroughs had a fume problem resulting from inadequate make-up air and heavy fume loading from tank agitation. Their answer: a ventilating system built around new units designed *specifically* for plating fume collection–AAF Type M Cycoils. These units achieve higher collection efficiencies than conventional collectors, yet are lighter, less bulky and lower in cost.

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem, regardless of the metal. Where are dust, fumes or mists causing you trouble –grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

For the answer to your plating fume problem, call your local AAF representative, or write for Bulletin 286. Address: Mr. Robert Moore, American Air Filter Company, Inc., 443 Central Avenue, Louisville, Ky.

AAF American Air Filter

BETTER AIR IS OUR BUSINESS



OPEN
IT...

FOR UP TO 4% EXTRA NET PROFIT

In the Texaco man's briefcase is a plan for cost control through organized lubrication—Texaco's "Stop Loss" Program. Management in many different industries is already using it to cut operating costs. The resulting savings go directly into profits. Up 4% is the average. To find out how you can turn excessive costs into profit, write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. S-200

TEXACO

Made by skilled craftsmen from
WASHBURN STEEL
its Uniformly Superior Quality
insures the Dependability of your
springs. *Famous for years.*

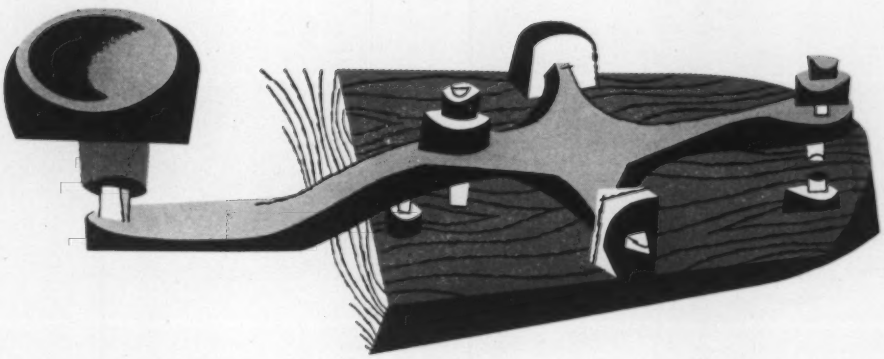
Eagle Music Wire
—for Dependable Springs—

Have you tried our
Phosphate Coated Wire?
Superior uniformity of PHYSICALS

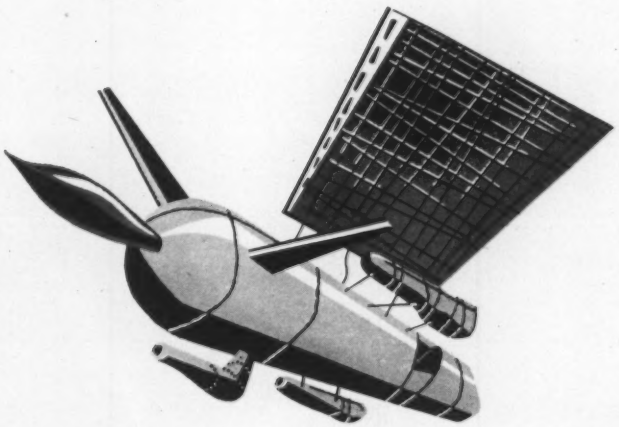
112

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



REMEMBER?



The telegrapher's key is a time-honored means of sending messages. However, it takes its place in the Dark Ages of Communications when compared with space satellites which will one day orbit the earth to make possible the instant transmission of messages to every point on the globe.

In the field of metal fabricating, Wiedemann Turret Punch Presses also break the communication and cost barrier.

No longer is it necessary for a shop man to study over a maze of hard-to-read drawings. No longer does production depend on his accurate interpretation or re-interpretation. No longer will you pay for this non-productive delay to production equipment.

With a Wiedemann:

The operator locates and positions holes and openings to an X and Y coordinate chart. This permanent record leaves no room for errors and it is prepared without delay of expensive equipment.

Better yet, the Wiedematic takes a typewriter-made tape and produces the part complete in a single operation.

Remember, these machines are cost savers on short run and medium production lots:

1-10-100-1000-or more!

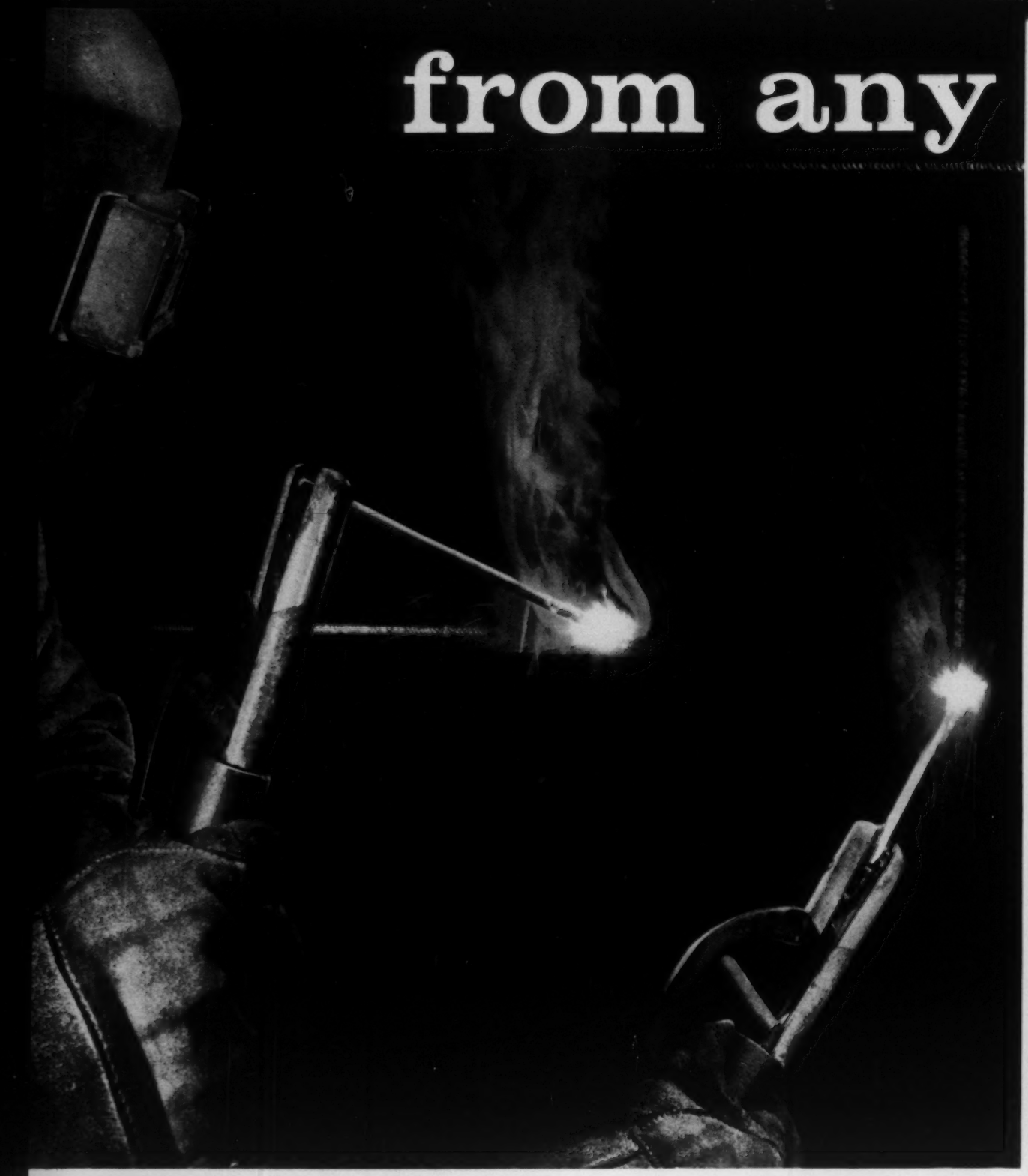
From the versatile 150 ton R-15 down to the hand operated R-2, there's a Wiedemann for your short run piercing requirements.

WIEDEMANN

WIEDEMANN MACHINE COMPANY

Dept. S6, Gulph Road • King of Prussia, Pa.

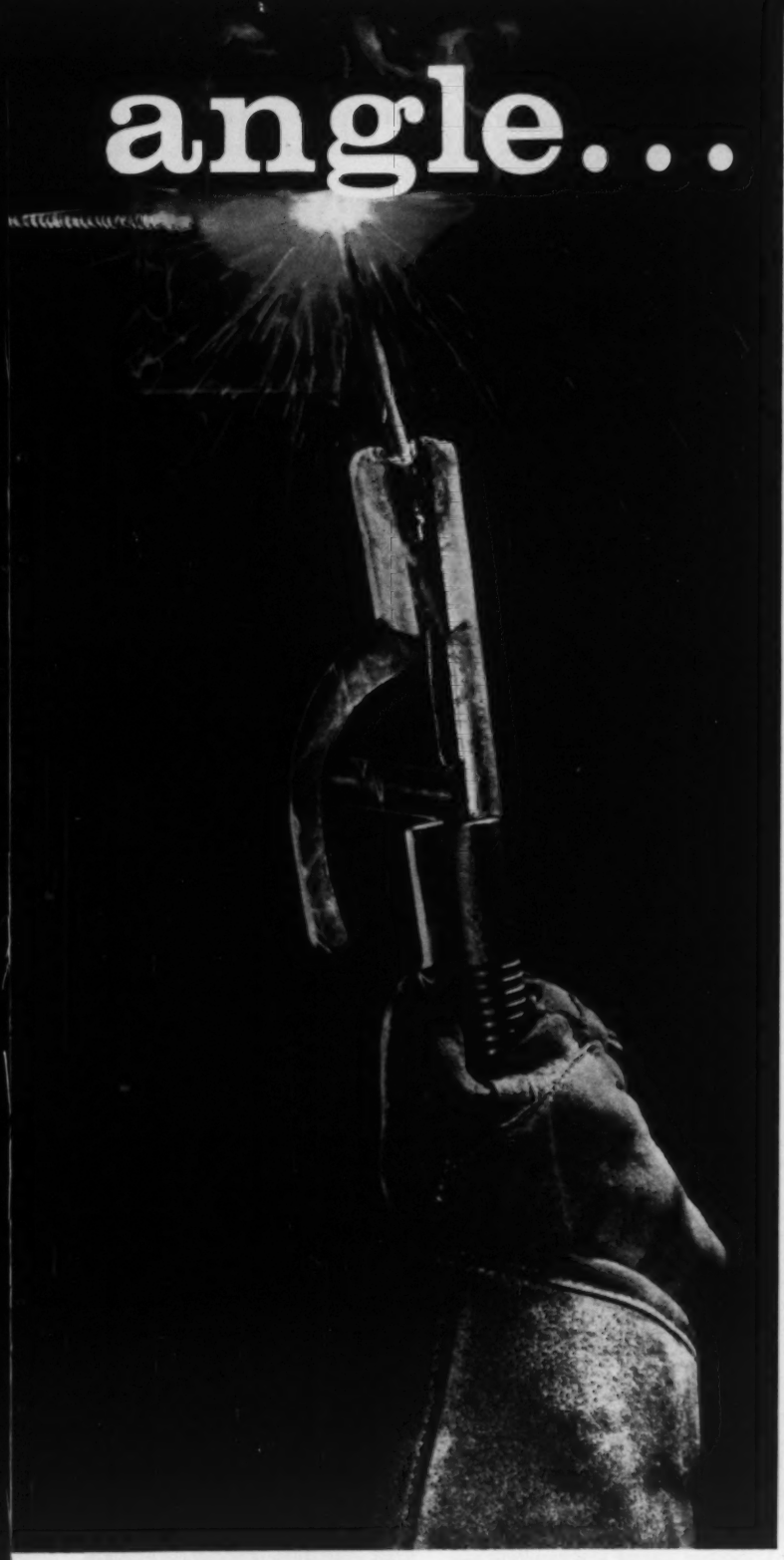
from any



HORIZONTAL — Try the new SW610 on single and multipass fillets and you'll find it superior to any electrode in its class. A less convex bead, due to better wetting action with sufficient throat reinforcement to prevent cracking . . . a quieter, smoother arc, producing far less spatter . . . a stronger coating crater or flux crucible for better arc direction and deeper penetration. From the standpoint of value — greater operator appeal and higher deposition efficiencies, resulting in less cost per pound of deposited metal.

VERTICAL DOWN — Here's where the SW610 is really in a class by itself. It's the only E6010 electrode capable of depositing a vertical down stringer pass free of pits. And this really "shows up" where x-ray checking is required. This advantage, coupled with its strong coating crater and deep penetration, makes the SW610 a natural for pipe welding. From the standpoint of value — rejects and rework time are reduced to an absolute minimum, especially when radiographic requirements must be met.

angle...



OVERHEAD — Better arc direction is the secret of SW610's amazing out-of-position efficiency. No loss of arc direction due to electrode breakdown and weak crater. Instead, a strong coating crater produces better arc direction, enabling operator to put metal where he wants it . . . smoother metal transfer results in less spatter . . . fast-setting slag and good wetting action produce a desirable flat bead. From the standpoint of value — easy out-of-position welding with costly stub loss reduced to a minimum.

you can put metal where you want it with the new A.O.SMITH SW610

The new A. O. Smith SW610 outperforms any electrode in the E6010 class. In fact, it's so good in all positions that you might say it's in a class by itself.

You get all this with the SW610: Strong coating crater for good arc direction . . . greatest resistance to breakdown . . . no pitting in the vertical down position . . . smoother metal transfer for maximum operator appeal . . . deep penetration for rough jobs . . . better wetting action, producing less undercut . . . less spatter, resulting in reduced cleaning time.

Welds too good to be true. All you have to do to test the SW610 is to send for free sample electrodes. Or get in touch with the A. O. Smith representative near you.

Through research . . . a better way

A.O.Smith
CORPORATION

WELDING PRODUCTS DIVISION
A. O. SMITH INTERNATIONAL S. A.
Milwaukee 1, Wisconsin, U.S.A.

Steel Warehouse Handles 3500 Stock Items with "TRAK-RAK" Crane

——— *Reduces Operating Costs... Speeds Service*

1. "TRAK-RAK" Crane moving into aisle between double rows of racks. Racks are 20 ft. high. Distance from floor to underside of roof truss is 30 ft. Aisle width is 5 ft.-4 in.

Edgcomb Steel of New England, Inc. warehouses 3500 different items of steel, stainless steel, brass, and aluminum bar stock in an area 60 feet wide, 27 feet high, and 160 feet long.

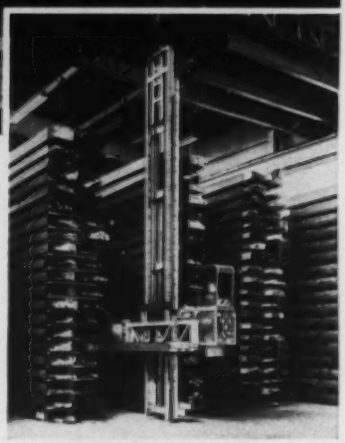
ONE man and a "TRAK-RAK" Crane serve the five double rows and two single rows of "Christmas Tree" racks which hold 2700 storage trays. Edgcomb processes approximately 2500 to 3000 orders per month, and the company reports very favorable reductions in operating costs and faster order processing and delivery.

Edgcomb's "TRAK-RAK" Crane has a traveling bridge (Photo 1) which spans the storage bay, and an overhead trolley from which is suspended an electrically operated rotating column equipped with a carriage for handling the storage trays. All operations of the crane and carriage, which rotates, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage. Safety switches prevent the column from running into a rack and permit full rotation only when the unit is safely beyond the end of the racks.

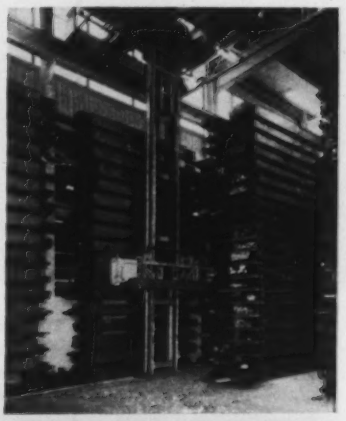
Hundreds of "TRAK-RAK" installations, designed to meet the user's particular requirements are in use today. They are handling many types of material and loads with great speed and economy. Specific advantages the "TRAK-RAK" System of vertical storage and handling brings to the user are:

1. **Maximum utilization of the cube to permit storing and handling more material in less floor area.**
2. **Faster material movement in and out of storage.**
3. **Reduction in personnel and lower labor costs.**
4. **Improved safety, better housekeeping, precise inventory control.**

Take the first step toward faster, more efficient material storage and handling now. Write for complete details on "TRAK-RAK." Chicago Tramrail Engineers are available to discuss your handling problem with you at any time—and at no obligation to you.



Crane with operator, who rides with carriage, emerging from aisle with loaded stock tray.



Picking up or depositing stock trays on the rack is a fast, safe operation. Trays and rack sections are color coded for quick location and identification.

CHICAGO TRAMRAIL DIVISION
CONCO ENGINEERING WORKS, INC.

1326 SOUTH KOSTNER AVENUE
CHICAGO 23, ILLINOIS

Specialists in the design, manufacture and installation of material handling systems for steel warehouses and other industries

Who Buys Roebling Upholstery Spring Wire After You Do?

The end-user can hardly be expected to know a great deal about Roebling Springkote* Wire, helical spring wire, border and brace wire, zigzag and no-sag wire, wire for automatic machines, lacing wire . . .

Thus, the qualities of uniformity, temper, tensile strength, size and finish that are yours whenever you use Roebling Spring Wire mean long life, resiliency under constant use (and abuse) where it counts the most . . . to those who buy Roebling Upholstery Spring after you do.

When *you* buy it, you have the advantage of getting these qualities in *large coils*—up to 3000 pounds for uninterrupted production. For further details, write Roebling's Wire & Cold Rolled Steel Products Division, Trenton 2, New Jersey. *Reg. applied for

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

"Our die casting demands the instant, controlled heat of GAS"

R. D. Bliss, Vice President, Wheaton Die Cast Company, Millville, New Jersey

Wheaton Die Cast Company produces zinc and aluminum castings. In melting the metals, they demand the heating speed and precise temperature control that only *gas* can give them.

With gas heat, in custom-made equipment, Wheaton has perfect control of the 825° F. they hold in zinc die casting, and 1200° F. with aluminum. They also find that gas is cleaner and more dependable than other fuels for their operation.

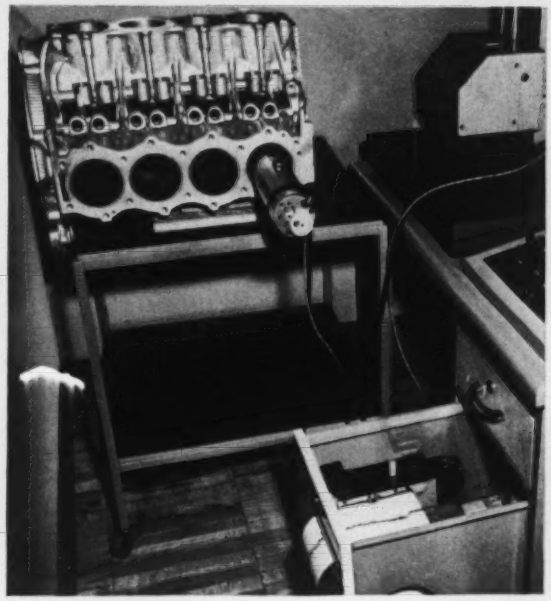
Wheaton has eliminated downtime delays with the speed and efficiency of gas. It's their choice of fuel for all heat processing—as well as for heating the plant—because of its unbeatable economy, uniformity and dependability.

Thousands of companies find that gas is technically right and economically sound for all types of heat processing. Let gas help you improve processes, cut costs. Call the Industrial Sales Engineer at your local Gas Company.

American Gas Association

FOR HEAT PROCESSING... GAS IS GOOD BUSINESS!

BREAKING MEASUREMENT BARRIERS WITH MICROMETRICAL



SHOWS CYLINDER WEAR: HOW MUCH and WHERE

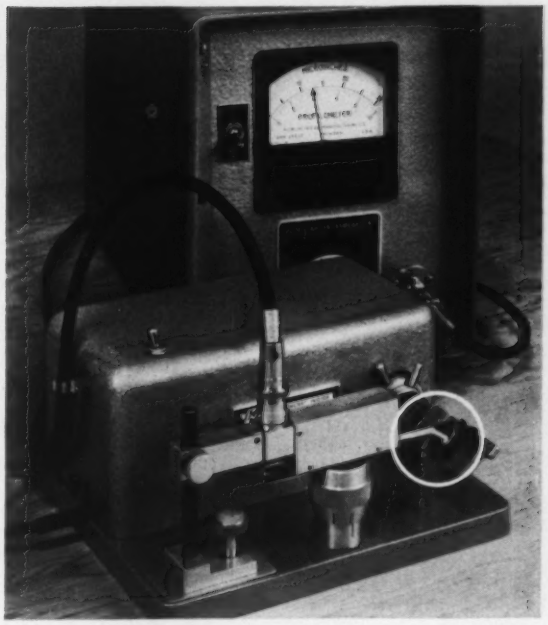
PROBLEM: To determine (1) the surface texture obtained inside cylinder bores from various production processes, and (2) the amount and location of cylinder wear after trial runs. SOLUTION: Obtain magnified profiles of the surface—tracing lengthwise with a Proficorder® Internal Linear Pilotor inside the cylinders as shown at left. The pen-drawn profiles show the height and width of waves, steps, flaws, wear and roughness irregularities.

For more about the Proficorder, ask for BULLETIN LT24.

ROCKABYE RIG REPORTS ROUGHNESS

Production-checking the roughness of a recessed concave spherical surface is a cinch with the Profilometer® equipment at right. The Pilotor "rocks" the work-piece in an arc to move the surface back and forth beneath the Tracer point, while the meter shows the roughness in microinches. BULLETIN LT126 gives details.

There's Profilometer equipment for measuring the roughness of practically ALL machined and finished surfaces—quickly, dependably, in the shop. For features and applications ask for BULLETIN LT14.



MEASURES BALL BEARING NOISEPOWER

A company making electric motors found that ball bearings were a frequent cause of noise and vibration; and testing bearings by sound or touch failed to weed out the noise-makers. They licked this problem with the Anderometer® (left)—measuring all ball bearings in receiving inspection for vibration characteristics, and using only those whose Anderon ratings assure smooth, silent running.

BULLETIN LT11 describes the Anderometer. May we send you a copy?

MMC® MICROMETRICAL MANUFACTURING COMPANY
A SUBSIDIARY OF THE BENDIX CORPORATION
3621 S. STATE RD. ANN ARBOR 13, MICHIGAN

Manufacturer of the PROFILOMETER® • PROFICORDER® • MICROCORDER® WAVOMETER® • ANDEROMETER® • VAROMETER®

Steel

THE FINER TOUCH

Accuracy. By a steelmaking specialist. Ladle a sample. Test. Check again and again ■ Much may depend on tiny pellets of alloying metal in a furnace of molten steel. The strength of a bridge. The corrosion-resistance of a chemical vessel. Accuracy is essential to the skilled builders of these vital projects ■ And it's a characteristic long associated with Lukens . . . in research, in producing plate steels. Carbon plates by the thousands of tons. Special-duty clad and alloy steels. Armor steels. Heads and steel plate shapes. Accuracy is one of many characteristics that make Lukens—

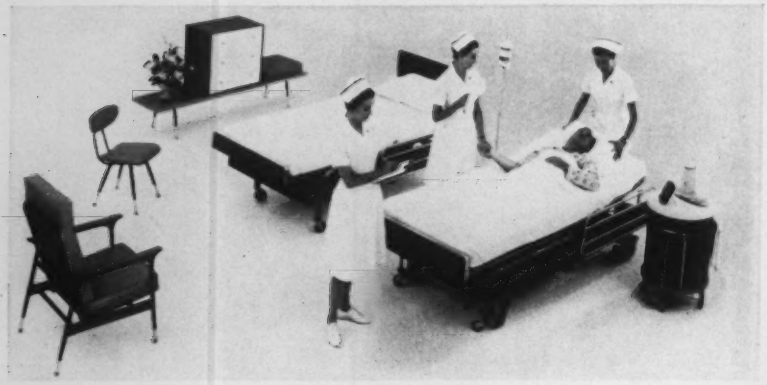
THE SPECIALIST
IN PLATE STEELS

LUKENS STEEL

COATESVILLE, PA.

PHOTOGRAPH BY PAUL WELLER

How to use Clad-Rex vinyl-clad metal in the design and engineering of hospital furniture and other products



Vinyl-Clad metal used in patient room furniture by American Seating

The sheet metal nature of Clad-Rex vinyl-clad metal would seem to indicate generally how it can be used. However, the unusual characteristics added by the vinyl coating itself make the areas of usage much broader than might be expected. So as not to overlook possible applications within your product line, consider Clad-Rex as a basic material. Measure each of its advantages against the individual parts and subassemblies of your products as well as the whole enclosure. In this manner your manufacturing methods and costs, your sales appeal, and product profit can be best helped.

The sales appeal of Clad-Rex vinyl-clad metal

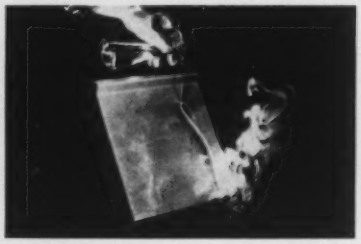
The vinyl surface of Clad-Rex is, in fact, a finish. It is available in a broad range of colors and embossed textures. Actually, Clad-Rex provides an almost unlimited variety of stock and custom multi-color patterns. Special prints in register can be provided also. The stock line, bleached walnut decor used by American Seating gives the feel and rich warmth of fine wood.

The abrasion resistance of Clad-Rex vinyl-clad metal

The vinyl surface of Clad-Rex, being a poly-vinyl chloride film, offers great resistance to abrasion. This wearability would include scuffing and scraping. Texturing effectively hides even deep cuts in the vinyl surface. This resistance to abrasion enables American Seating to capitalize on fine finish without extraordinary care in handling during manufacturing. Matter of fact, rejects common to highly finished products are greatly reduced with vinyl-clad metals.

The corrosion resistance of Clad-Rex vinyl-clad metal

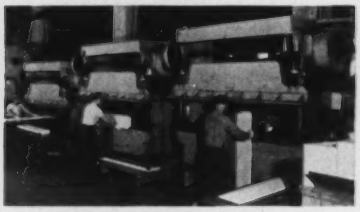
Having all the advantages of poly-vinyl chloride, the surface of Clad-Rex vinyl-clad metal protects against acids, alkalis and other corrosive chemicals. It is free of pin holes. As a result, it offers unusual dielectric properties as well.



The tops of the "Bedside Susan" Cabinet and "Overbed" Butler in the American Seating group are sanitary white, non-staining Clad-Rex.

The fabrication of Clad-Rex vinyl-clad metal

American Seating methods for fabricating Clad-Rex vinyl-clad metal are much like they used for bare sheet metal. Finishing, of course, is not needed. Press and brake forming, crimping, etc., are all practical.



Most important to any remarks about fabrication—although Clad-Rex is obviously different from bare metal, the unusual quality of the vinyl-to-metal bond tends to minimize the difference. As a result, American Seating fabricates within their own facilities without complex or unusual techniques or tooling.

All conventional, mechanical methods of fastening are commonly used. However, although vinyl-clad metal parts can be assembled with stud and projection resistance welding, some limitations in spot and seam welding do exist. Until the present research for a solution is completed, other conventional methods of joining must be used.

A source of engineering service

Take full advantage of the engineering and research facilities of Clad-Rex. Call or write for Report 6101, "How to Use Vinyl-Clad Metal in the Design and Engineering of Commercial Furniture". *Simoniz Industrial Products, 11504 West King Street, Franklin Park, Illinois (Phone Gladstone 1-2323).* 26C

Clad-Rex Vinyl-Clad Metal is a product of

RESEARCH • DEVELOPMENT • ENGINEERING

SIMONIZ INDUSTRIAL PRODUCTS

A Division of Simoniz Company

CLAD-REX VINYL-CLAD METALS • **SIMONAIRE** FOAMS AND INDUSTRIAL CHEMICALS
SIMONIZ RESEARCH, DEVELOPMENT AND ENGINEERING

Photo courtesy Maas-Hansen Steel Co., Los Angeles, California

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING . . . P&H!

This low-cost, 10-ton floor-controlled P&H overhead crane is a production tool tailored to meet the multiple handling needs of this steel service center. Equipped with interchangeable coil and sheet steel grabs, as well as a hook scale, it warehouses the steel, services the shear, and loads shipments in a manner impossible to match with surface-bound equipment. Aisleways are reduced to an absolute minimum; valuable floor space is made to pay for itself.

Before you draw up your next crane specification, get the help of your local P&H man. He's backed by the largest group of engineers in the crane industry . . . and 76 years of experience in crane building. Then send your next crane inquiry where *most* smart buyers do — to Harnischfeger, world's largest builder of overhead cranes!

HARNISCHFEGER
Milwaukee 46, Wisconsin

P&H
OVERHEAD CRANES

Offices in major cities... see Yellow Pages

This P&H floor control station for overhead cranes puts easy pushbutton load handling under the operator's thumb. Depending upon service and load requirements, P&H floor-controlled cranes offer you a choice of single-, two-, or variable-speed control. Where needed, a skeleton cab can also be provided for overhead operation, and the pendant lowered to floor for intermittent use.

ENGINE BLOCKS:

HOIST 'EM FAST, HANDLE 'EM SAFELY!

These P&H Zip-Lifts play a vital role in the production setup for this modern automobile engine plant. They keep the ever-hungry transfer machines fed with a steady flow of engine blocks. In this production area, for example, P&H Zip-Lifts make up to 100 or more lifts an hour . . . throughout the day, day-in, day-out!

These heavy castings must be handled both quickly and safely. That's why P&H Zip-Lifts are on the job — they are the safest hoists in their class, and (like the name says) they've got plenty of *zip*.

Isn't worry-free dependability and fast handling like this just as important in your operation? Find out more about the quality design features of P&H hoists. Surprisingly, real quality like this is priced unusually low, starting around $200. Call your nearest P&H Distributor — or write for Zip-Lift Bulletin H-20, Department 230, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER
Milwaukee 46, Wisconsin

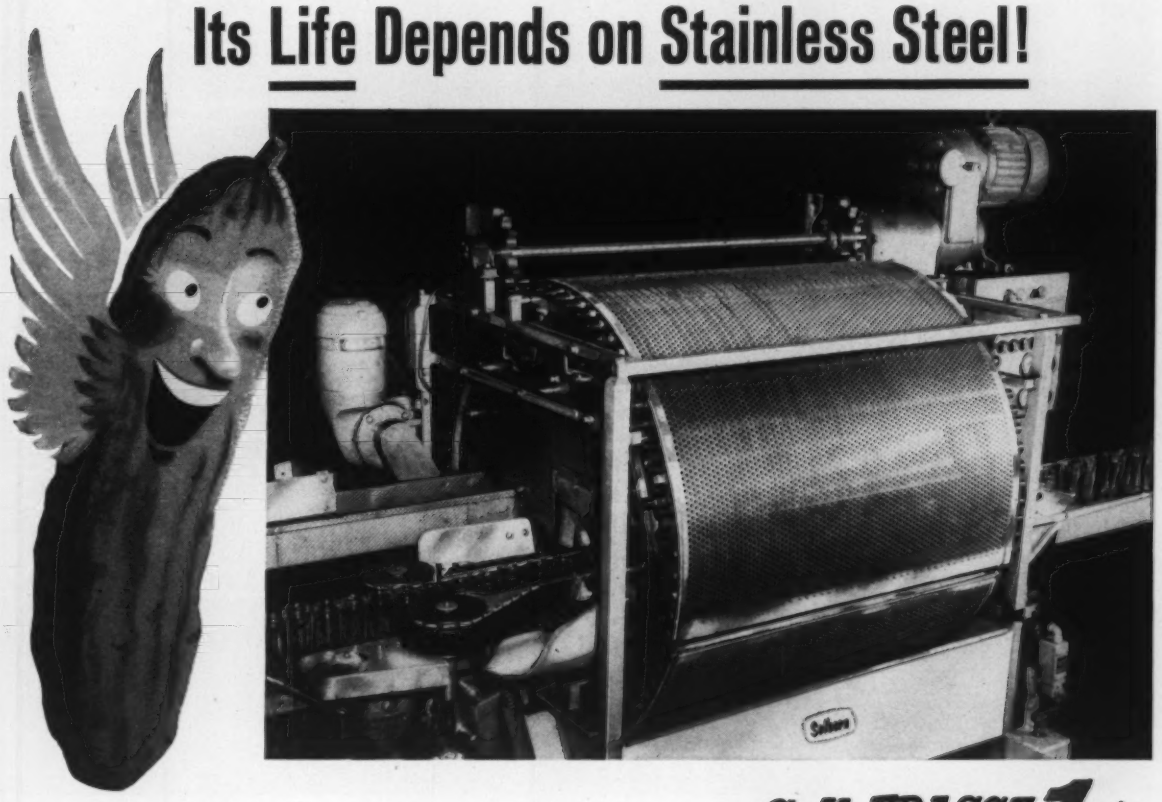
P&H
ELECTRIC HOISTS

See your Yellow Pages under "Hoists"

Photo courtesy Chrysler Corporation, Detroit, Michigan.

Meet the "Pickle Packer"—

Its Life Depends on Stainless Steel!



Pickles fly when this ingenious "Pickle Packer" goes into action. With unbelievable precision it packs 6,000 a *minute*—fills 18,000 jars an hour ...even guarantees full measure in the bargain. Seven times faster than previous methods...it's far less costly!

Despite corrosive brine, trouble-free operation and long life pose no problem...the "Pickle Packer" is completely made of corrosion resistant stainless steel. Stainless steel protects product purity—is easily cleaned ...meets sanitary codes.

Stainless steel bars, angles, sheets, plates, tubing and pipe are used in the "packer"...yet *every* item is shipped *from stock* by Frasse. Frasse carries every rolled form—in a wide range of sizes and analyses...has a wealth of know-how in applying stainless to *build sales.*

Think your product can use more *life*—and the built-in sales appeal of stainless steel? You'll profit by a call to Frasse.

Call FRASSE 1st for

COMPLETE

STAINLESS STEEL SERVICE

Bars	**Forgings**
Sheets	**Strip**
Plates	**Tubing**
Pipe	**Wire**
Fittings	**Valves**

Peter A. Frasse & Co., Inc.

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How Nickel gets music out of solid rock

Deep in the Caverns of Luray in Virginia is one of the world's musical marvels—the famed "Stalacpipe" organ—a unique instrument that gets rare tonal beauty from age-old stalactites.

To get music out of solid rock, the stalactites have threaded metal rods bolted through them—close to small, wire-wound magnets. When an electronically-controlled hammer strikes a stalactite, the combination of rod and magnet becomes a tone generator whose impulses pass out through an amplifier.

Imagine the dampness of the Caverns . . . the rust-producing environment . . . and what could soon happen to these musical rods bolted through the rock. Here is where a metal has to really prove itself.

Nickel means trouble-free performance. To prevent excessive rust and resulting expansion that could easily crack or snap off the stalactites, a special electrical steel—a steel with Nickel in it—was chosen. This high nickel alloy steel—47-50% Nickel—stands up to the eternal dampness of this underground concert hall . . . and provides the exact combination of magnetic properties needed for low power requirements and full high fidelity.

Don't overlook Nickel even if you're not thinking of building an underground organ anytime soon. Alone or with other elements Nickel improves hundreds of alloys . . . makes possible almost any combination of properties for fabricating or service demands.

Whatever your metal problem—high or low temperatures, corrosion, stress, or an unusual combination of factors—consider the advantages of Nickel. For more information, just write us.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N.Y.

Big tone from little Nickel alloy rods. Pen shows the size of Allegheny Ludlum Steel Corporation's AL-4750 nickel alloy special steel rods bolted through ancient stalactites. The rods vibrate with the rock after being struck by rubber-tipped hammers.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Domestic Aid

We have been studying world steelmaking expansion over the next five years as projected by the Economic Commission for Europe.

ECE says world steel capacity will increase about 200 million tons by 1965. The increase will be 50 per cent greater than 1960 production.

Percentagewise, some of the projected increases are startling. Red China, for example, will almost double its capacity to 40 million tons. Russia, United Kingdom, France, West Germany, and Japan will make substantial increases. A number of hitherto nonindustrialized nations will get into the act.

The rate of growth in world steel capacity will be about 5½ per cent annually.

We believe any country's steel capacity is a fair gage of its metalworking stature. Steel mills are built to supply domestic demand, not to export steel mill products. The tradingest countries of all, those in the Common Market, plan to export less than 15 per cent of output.

The ECE projections suggest that the fantastic industrial growth in foreign countries of the last decade is only the beginning. They suggest that U. S. metalworking must accelerate its growth or lose stature.

They accent the need for modernizing our plant and equipment to become more strongly competitive in the world market.

Hickman Price, assistant secretary of commerce for domestic affairs, suggests two measures to help:

1. Massive doses of tax incentives to encourage the re-equipment of our plants with the most efficient machines and tools available.

2. Massive doses of research and development to improve present industries and to create brand-new industries. Mr. Price proposes the government might well encourage research and development—in co-operation with industry—by offering tax incentives for pure research.

The secretary suggests that those moves would help solve our unemployment problem, stimulate our rate of industrial growth, and enable the U. S. to become more competitive in world markets.

We concur with Mr. Price. We hope he can persuade the administration and Congress to give us more than lip service in that domestic aid program.

Walter J. Campbell

EDITOR

NEW RELIANCE SYSTEM FOR AUTOMATIC POSITIONING OF MACHINE TOOLS

This drilling machine is operated by Reliance Programmed Numerical Control. It cuts the costs of lead time and expensive tooling. It provides fast, highly accurate positioning . . . electrical accuracy of ± .0001 inch and repeatability of .00001 inch can be achieved. This is an absolute system operating from a fixed reference with no cumulative error.

The Reliance drive operates feed motors at high speed until position is approached. Motors are then slowed down in proportion to the distance from the programmed point, stopping at the exact position. Any number of linear or rotary motions can be controlled simultaneously or individually for complete automatic operation. Provision is also made for programming auxiliary functions, such as turret selection, clamping and coolant control.

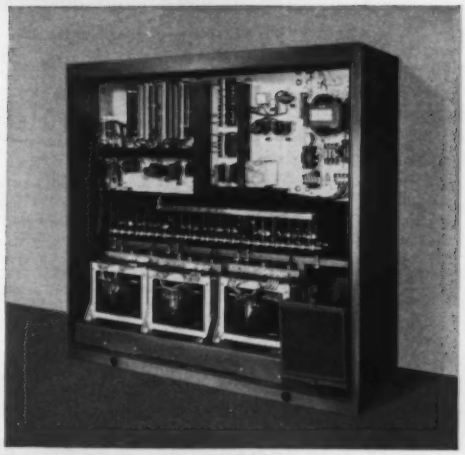
Reliance Programmed Numerical Control uses 8-channel machine tape or dial selector switches for input. Operates from standard tape processing and reading equipment.

It will pay you to get the complete facts about this equipment. Your Reliance Sales Engineer has all the information. Consult the Yellow Pages or write us direct.

A-1826

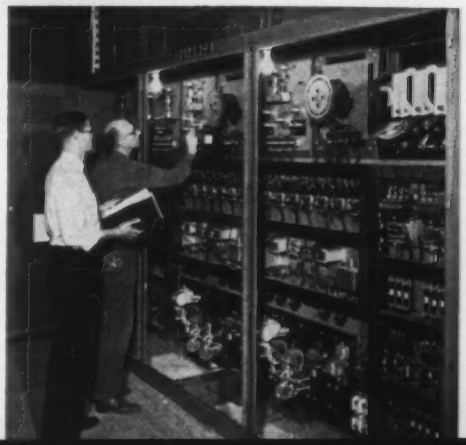
RELIANCE...builders of the tools of automation

NEW DUTY MASTER D-5000 design brings you new standards in coolness, quietness . . . and more horsepower in less space. Frame dimensions that held 150 hp. now contain 300 hp. There is better heat dissipation from the frame itself. Air flows easily through the entire grilled end areas—exhausts through long, protected slots at the sides and bottom. New fingerless ducted rotor design means better cooling than any other previous motor. You get all famous Duty Master features in this new D-5000 . . . special lubrication design, drip or splash-proof and complete open motor protection. Bulletin B-2515.



RELIANCE V★S STATATRON is a static powered drive for wide range variable speed from in-plant a-c. circuits, available from 1 to 200 hp. Instead of a motor-generator set, the Statatron uses silicon diodes and saturable reactors to rectify the current from a-c. to d-c. These work in combination with a transistorized power exciter to supply variable voltage. Statatron is compact—35% smaller than conventional units. Consists of only three components: Super 'T' d-c. motor, operator's station and control cabinet. Statatron is quiet—vibrationless and low in maintenance cost. Bulletin D-2508.

THIS MASTER GEARMOTOR drives a chip conveyor on an automatic screw machine. The combination parallel and right angle reduction produces efficient low output speed at high torque—ideally suited to this operation. Features important here are its compactness and one piece construction, saving space and maintenance. This Master Gearmotor is impervious to liquids . . . splashing of coolant and any other outside contamination. Where the situation calls for gearmotors, this full line can cut your engineering and assembly costs . . . give you dependable performance. Bulletin E-2409.



TOTAL SERVICE is an integral part of every Reliance product, from engineering and start-up assistance to maintenance and renewal parts. The photo shown here is typical of a Reliance Service Engineer's on-the-job availability—for maintenance and consultation on knotty problems. Every Reliance Sales Engineering Office and Distribution Center—nationwide—gives you the attention and experience necessary to assure the top performance you expect from the Reliance equipment you buy.

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 4-6, CLEVELAND 17, OHIO • Canadian Division: Toronto, Ont.

There's a Full Tool Steel Warehouse
Behind the A-L STEELECTOR Cards!

The pocket-size STEELECTOR Cards represent a full tool steel warehouse—full of the grades and shapes and sizes.

Each STEELECTOR Card (there are cards for hot work, high speed, and tool room applications) uses bar graphs to show how the STEELECTOR grades compare in abrasion resistance, toughness, size stability, machinability, and red hardness. In a glance you can select the grade with the best combination of properties for virtually any job.

And when you select a STEELECTOR steel, you know beforehand that it is quickly available. Warehouse supplies have been increased because of the widespread usefulness of STEELECTOR grades.

A Data Stock List for each STEELECTOR grade gives you additional information—to help you make sure that the steel fits your job exactly. The steel's properties are described and the proper hardening, tempering, and annealing temperatures are given along with the steel's analysis and AISI number. A list of typical applications together with suggested working hardnesses serves as an additional check on your use of the steel.

The Data Stock List also tells exactly what sizes and shapes are in warehouse stock. You know before you order that the tool steel you choose is ready for prompt delivery.

By using STEELECTOR grades, you can save storage space in your own plant. You can reduce the number of grades you stock. And you can rely on fast off-the-shelf delivery in case your own stock runs low.

For more information on the STEELECTOR system, ask your Allegheny Ludlum representative for your copy of the colorful, 10-page STEELECTOR Booklet, or write: ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*** Address Dept. S-6. 9240

STEELECTOR PROGRAM

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country

Are you within the law?

Examine Your Trade Practices

DONALD L. PRICE, vice president, Norton Co., Worcester, Mass., offers management this checklist for examining its operations.

1. **Who has authority to establish prices? On what basis are they established? Will your pricing policy stand close scrutiny?**
2. **Do you have special discounts for special customers?**
3. **Do you have a policy, approved by your legal advisers, which is common to all middlemen serving the same types of industries?**
4. **Are you making false or unfair claims in your advertising? Does your advertising department treat all distributors and dealers alike in respect to cost of promotional material?**
5. **Are your product specifications held rigid? When value is added, are prices adjusted on a common basis to all customers?**
6. **Is your credit policy uniform, or do you allow special considerations to special customers?**
7. **Does your policy treat all customers equally on shipping costs?**
8. **What trade associations do you belong to? What are their objectives? Why do you belong?**
9. **Is your legal department or legal counsel qualified to advise you on marketing policies? Does legal counsel participate in major marketing discussions?**

How to Live with the Government

THE KENNEDY administration has served notice that it will have little patience with businesses violating any federal statutes. New Frontierism is bringing closer scrutiny of pricing, advertising, distribution, expense accounts—to name a few.

That's what managers were told by high ranking administration spokesmen at a three day, American Management Association briefing session on "The Role and Influence of Federal Regulatory Agencies on Marketing."

One unspoken warning was evident: Better brush up on what you and your company can and cannot do. The administration is set to more strongly enforce laws and regulations and to push for new legislation to plug what it considers loopholes.

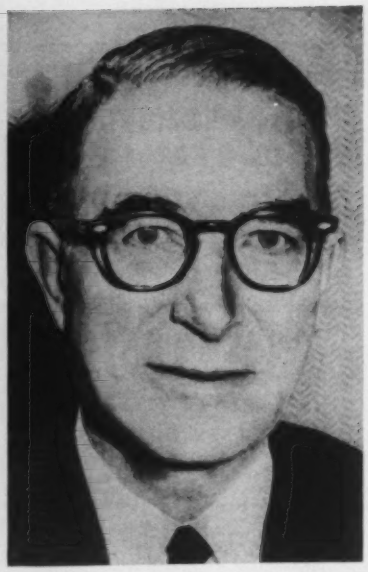
Listen to Donald L. Price, vice president, Norton Co., Worcester, Mass.: "Management must know what it can and cannot do to keep its organizations strong and profitable. I have a strong feeling that if all the presidents, vice presidents, directors of marketing, general sales managers, and all others in sales work were polled as to what they know about trade practice laws, we would be embarrassed and stunned by our ignorance. There is no question in my mind that management needs education and counsel in this area."

• **Law & Mr. Kennedy**—Attorney General Robert S. Kennedy is firmly convinced that pricing conspiracies, similar to the recent electrical manufacturers' case, are widespread. Says Mr. Kennedy: "I would say there is serious price fixing in almost every one of the major communities in the U. S."

You can look for the Justice Department to seek criminal indictments against individuals in price fixing cases. In Mr. Kennedy's words: ". . . We expect to not only move against the companies or corporations which have been responsible but also against the individuals who have participated."

Mr. Kennedy says his department

Attorney General Kennedy: ". . . there is serious price fixing in almost every major community in the U. S. today . . ."



Senator Kefauver: ". . . the law should be changed so that an officer of a corporation is liable for price fixing . . ."

is not greatly concerned about industries where everyone follows a price leader.

• **Changes in the Wind**—But H. Graham Morison, senior member of the Washington law firm, Morison, Murphy, Clapp & Abrams, believes: "Unless the signs deceive me, I believe that the most significant policy of the new administration in the area of price will be to wage a wholesale assault on the anomaly of price leadership in major U. S. industries (where one company, the price leader, changes quotations, and the others automatically follow)."

The result of this follow-the-leader policy, says Mr. Morison, is that price competition ceases, although there may be vigorous competition in other areas.

The practice could be upset two ways, believes Mr. Morison: First through judicial action, where such pricing policies would be interpreted to violate civil antitrust statutes; second, through Congressional action to expand Section 2 of the Sherman Act to make price leadership a monopolistic action in some instances.

• **Mr. Kefauver Steps In**—Sen. Estes Kefauver (D., Tenn.) informed the AMA that there is not sufficient legislation on the books today, particularly in the area of identical pricing and sealed bid conditions.

The senator believes the law should be changed so an officer of a corporation would be liable in a price fixing case if he's aware of it and does nothing to stop it—even though he may not be involved personally.

The senator asks: If a labor leader who is convicted of a crime can't hold union office for a period of time, why shouldn't the same rule apply to a company manager? And the idea's growing, says the senator, to make identical bids direct evidence of price violation.

• **What to Look For**—The government deals with pricing in two distinct ways:

1. Direct regulation by administrative agencies (rails, gas, airlines, shipping).

2. Removal of private restraints through enforcement of antitrust laws.

Under the Kennedy administration, believes Mr. Morison, the process of price and rate regulation will remain relatively unchanged. But we can look to substantial and far-reaching changes in antitrust laws.

Advises Mr. Morison: Watch for an unprecedented degree of coordination in antitrust policy between the Justice Department (civil and criminal cases under the Sherman Act) and the Federal Trade Commission (civil cases only under the Robinson-Patman Act).

You don't have to conspire to fix prices to be in violation of the law. Any agreement between competitors involving business practices is a violation. Examples: Agreements not to use trading stamps, or not to give premiums, or not to advertise prices. Also illegal: Attempts to fix resale prices charged by customers (except where authorized under state "fair trade" laws). It's still legal, in most cases, for the seller to refuse to deal with the buyer if he does not adhere to suggested resale prices. But the administration probably will move to close this loophole, believes Mr. Morison.

To keep out of trouble, keep these points in mind, advises Albert Seidman, attorney-in-charge, New York office of the Federal Trade Commission:

• Watch out for price discrimination on a regional basis where a local company or dealer is hurt through the large firm's pricing policy.

• It's illegal to sell a product of like grade and quality at two different prices in cases where the action creates unfair market influence. If you can show quantity discounts came about through mass manufacturing savings, there is no discrimination. But the burden of proof is on you. If you're challenged, you'll have to provide a cost analysis. So it's better to have made one before the fact than after it.

The best protection against charges of discrimination in giving advertising and promotion allowances to customers is to have a rate sheet which clearly shows equitable rates to all classes of customers.

• **Warns Associations** — A word of warning to trade associations from Mr. Seidman: They may collect statistical information on prices charged in the past and compile and distribute cumulative figures on an industry basis—but not for indi-

vidual companies. The exchange of current prices by associations (or firms) is dangerous.

Outside the area of price practices, the FTC will clamp down on a company perpetrating: Commercial bribery, piracy of product or idea, trademark and patent infringements, misleading advertising, coercion and intimidation of customers, cutting off competitor's access to markets, exclusive dealing contracts, unfair disparagement of customers, pirating employees of a competitor in wholesale lots, misbranding and mislabeling, and lottery devices in selling.

• **Watch the Adjective**—Mincing no words, tough talking Paul Rand Dixon, new FTC chairman, puts his agency's attitude towards advertising practices squarely on the line: "It is just as much a tool of monopoly to come in and lie about your product as it is to come in and make unfair and discriminatory price cuts. We're clamping down on both."

Mr. Dixon warns: In all areas that come under FTC jurisdiction, "we are going to use routinely the right of investigational subpoena which requires businessmen to answer questions under oath."

• **Taxes and You** — The Internal Revenue Service is moving fast into the field of automatic data processing. Each region will soon have an ADP service center. In addition, IRS is establishing a National Computer Center at Martinsburg, W. Va., for the maintenance of all tax accounts. The center will provide:

• For the first time, an up-to-date, consolidated and permanent account for every taxpayer, through which all transactions will be processed before presenting a net bill or refund.

• Systematic and easier identification of taxpayers who fail to file.

• Increased ability to detect mathematical errors.

• More efficient handling of tax returns and relative information documents.

• Help in identifying returns which have characteristics that suggest an audit.

You can expect stepped up scrutiny of tax returns by IRS. The current staff of 50,000 will soon be augmented to "permit adequate followup on leads supplied by the new automated machinery and to permit expanded audit coverage of certain types of returns."

• **Expenses**—A main target of IRS is to correct "abuses" in expense accounts. Increased attention will be focused on:

• Personal expenses claimed as business deductions (such as country club and athletic club dues and charges, maintenance of yachts, hunting lodges and hotel suites.

• Failure by employees to report as gross income expense account allowances or reimbursements received from employers which have not been accounted for to their employers.

• Deductions based on estimates or inadequate records.

You must maintain records that provide this information on expenses, says Charles A. Church, IRS assistant regional commissioner (audit), New York: 1. The relationship of the expenditure to the taxpayer's business. 2. The payee and the place of expenditure. 3. The amount of the expenditure. 4. The nature of the product or service received. 5. The identity of the person or persons entertained or the recipient of any gift. 5. Evidence of payment where the amount of the expenditure is unusual.

Gearmaker Profits Pinched

ALTHOUGH gear sales are showing a substantial, though spotty, improvement, profit margins continue to be the major concern of the nation's gearmakers. That was the consensus at the American Gear Manufacturers Association meeting in Hot Springs, Va., last week.

Net income per dollar of investment in 1960 was barely half of that industry's net in 1957, E. V. Carlson, Link-Belt Co.'s Philadelphia plant, chairman of AGMA's accounting council, told members. Gearmaker earnings, figured either on sales or investment, are well below those of most other metalworking industries, which are also plagued by worsening profits.

Mr. Carlson suggested one more important reason for the unsatisfactory earnings lies in the industry's costing practices.

• **Costs?** — Quoting liberally from STEEL's impact issue on price fighting (Apr. 17, 1961), Mr. Carlson suggested gearmakers should become more intimately acquainted with their true costs.

Walter J. Campbell, editor of STEEL, suggested:

1. That gearmakers not only should know their real costs, they should urge others to know theirs.

2. That they should continually strive to cut costs to enable honest and economic price reductions while maintaining fair profits.

Charles F. Bannan elected president of AGMA

3. That they should put more emphasis on quality, service, and engineering than on price.

4. That they should talk price last and should beware of price fighting rumors.

• **Officers**—The new president of the association is Charles F. Bannan, vice president, Western Gear Corp., Lynwood, Calif. C. R. Burrell, Tool Steel Products Sales Corp., Cincinnati, received the association's 1961 Edward P. Connell Award.

Meet Nelson Custer . . . American Auto Worker

NELSON F. CUSTER, 33, works as a machine setter and operator at Ford Motor Co.'s Engine Plant No. 2 in Brookpark, near Cleveland. He has worked there for eight and a half years and plans to continue with Ford.

Nelson was selected from among thousands of his fellow workers as a typical Ford hourly employee.

He lives with his wife, 33, and daughter, seven-year-old Patty, in an immaculate, four-room suite on the second floor of a two-family house at 3543 Woodbridge Ave., Cleveland.

He bought a 1959 Ford two years ago—getting "a good deal" from a Cleveland dealer. Before that, he owned a 1955 Ford. He lives 11 miles from the plant and drives there daily.

Nelson's gross wages average $482 a month. He works 40 hours a week; overtime is rare. On an hourly basis, he earns $2.78, about average for hourly people in his plant. His employment is pretty steady; his last layoff, in August, 1960, ran one week. He counts on a gross annual income of about $5675.

Each month, $105 is deducted from his gross earnings—for taxes, insurance, and other charges.

His rent is $40 a month. (Nelson does some of the maintenance around the house in lieu of rent.) Food takes $150 monthly. Car payments run $62. A bill for appliances and other items (at Sears, Roebuck & Co.) runs $21 a month. Insurance costs $23. An account with a mail order house averages $10 every month. The telephone costs $5. Nelson spends about $30 a month for transportation, recreation, incidentals, and some of his family's clothing. That leaves $35 to $36 a month for savings. The Custers plan to buy a house. They're working on a down payment.

The family eats well. A typical breakfast for the adults is juice, sausage or bacon, and eggs, plus coffee. Meat or fish is served at nearly every evening meal. The adults seldom eat dessert because they are dieting.

Mrs. Custer has acquired a new sewing machine and is learning to sew.

For recreation, the Custers bowl frequently and go on occasional weekend camping trips in Pennsylvania near their original home—Portage, Pa. During Nelson's annual paid vacation of two weeks, they usually go camping. Another recreation for Nelson is "fooling with the car." Television is a major interest for all three Custers.

Much of their life centers on the lively and bright Patty, who is doing well in the second grade—her parents have high ambitions for her.

After a 14-month stint in the U. S. Air Force as a radio and radar repairman, Nelson started his civilian working career in a Pennsylvania steel mill. But he likes his automotive job better and looks forward to spending the rest of his industrial career in such work.

Mrs. Custer starts cooking dinner

The Custers get together in this American setting

Meet Friedhelm Meier . . . German Auto Worker

FRIEDHELM MEIER, 30, works on the engine assembly line at Volkswagenwerk in Wolfsburg, West Germany. He has worked there eight years and plans to continue with the company. Some day, he hopes to become a foreman.

Friedhelm was selected from among thousands of his fellow workers as a typical Volkswagen worker.

He lives with his 28-year-old wife and two children, Elke, 8, and Holger, 5, in a small but pleasant four-room flat in a new apartment building at 26 Haendelstrasse, about eight blocks from the plant.

A year ago, he bought a Volkswagen, getting an employee discount. Before that, he rode a bicycle or walked. He still walks to work.

Friedhelm's wages average 600 Deutsche marks a month, equivalent to $150 U. S. He works 40 hours a week, with little or no overtime. On an hourly basis, his wages are 92 cents an hour, 7 cents over the factory average. His employment is steady, and he can count on an annual income of about $1800.

Each month, 90 marks is deducted from his gross earnings—for taxes, health insurance, and other social security charges.

His rent is 92 marks. Food costs 270 marks. Utilities take 55 marks, leaving 95 marks, or $23.75, a month to be spent for clothing, furnishings, transportation, recreation, and incidentals.

The Meier table is adequate but simple. On the day STEEL visited the Meier apartment, breakfast consisted of white bread, butter, and marmalade, with coffee for the adults and milk for the children. Dinner was liver, potatoes, milk, and home canned pears for dessert. Mrs. Meier cans large quantities of vegetables and fruits. Much of the produce comes from a garden plot which they rent outside Wolfsburg (for 450 DM on a 99 year lease). The garden not only augments the food supply, it provides a good part of the Meiers' recreation.

Friedhelm and his wife can save nothing after meeting their necessary expenses. Mrs. Meier sews, making much of her own and the children's clothing.

Despite the apparent financial stringency (by U. S. standards), the Meiers are happy with the present, confident for the future.

In addition to gardening, their recreation consists of walks and watching television. They can tune in on two channels. One is West German; the other originates in the Eastern Zone. Wolfsburgers tune in the Eastern Zone telecasts in the same spirit that U. S. soldiers listened to Tokyo Rose during World War II.

Friedhelm gets a three week paid vacation in July when the entire plant shuts down. The company pays an annual production bonus of 6 per cent of annual earnings before the shutdown, enabling many Volkswagen workers to scurry off to southern France or Italy for their holidays.

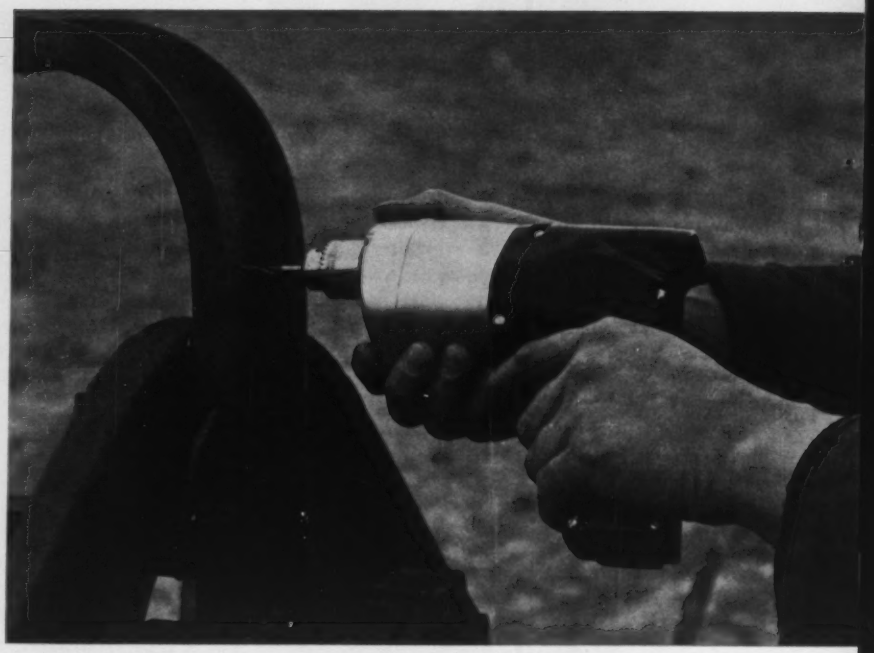
Mrs. Meier starts an omelet for family dinner

STEEL Editor Walt Campbell and German friends

Portable Tool Sales Snap Back

SALES of portable electric tools are showing some snap this year. With manufacturers' sales riding in an estimated $200 million to $225 million range, toolmakers are gunning to keep the 7 per cent increase gained in the first quarter of 1961 over the 1960 first quarter.

J. A. Proven, executive manager of the Electric Tool Institute, Evanston, Ill., gives this rundown: Industry observers are optimistic that the increase registered so far in 1961 will hold for the balance of the year. Since 1954, industry sales have grown a total of 30 to 35 per cent. But during the last half of '60, the sales curve wound up an estimated 3 per cent below the 1959 mark. This year, toolmakers expect to better the 1959 figure by a significant margin.



Black & Decker Mfg. Co.

Cordless drill is one of the newer innovations

• **Who Buys?**—The 30 or so companies making portable tools estimate sales are about equally divided between industrial and home users. Important buyers: Building trades, metalworking and woodworking shops, automotive service stations, service and maintenance trades, and householders—including "do-it-yourselfers."

The home or "do-it-yourself" market is continuing on a high demand plateau. Its growth has pretty much paralleled new home building, and an industry spokesman points out that much of the market potential lies in the fact that there are 10 million more homeowners today than there were ten years ago. Saddled with problems of maintenance, renovation, improvements, plus making additions to his house, the average homeowner has turned to portable electric tools to ease his lot.

• **Price Trend**—Although no major price increases have been made in the last two years, and none is anticipated in 1961, the price trend is upward. A number of makers adjust prices on items when costs of raw materials, components, and manufacturing are boosted.

Despite consistent jumps in those categories, the industry's stability and stiff competition have tended to keep the lid on prices for comparatively long periods. Some toolmakers point out that there is increased interest in quality, and buyers are willing to pay for it. It's emphasized that buyers have been getting more tool for their money in the last five years.

Many major manufacturers have considerably reduced prices on home workshop tools through mass production and redesign. The prospect: Prices will have to rise. The reasons: Higher costs of materials and labor.

• **Price Competition**—Tool manufacturers say prices are highly competitive. Special promotions, enabling dealers to enjoy extra discounts, are prevalent. One company controls price cutting in its organization via a selective distribution policy which prevents outlets from competing against each other. Rather than cut prices, it has pushed greater volume by providing special services to dealers, such as promotions, demonstrations, and direct dealer aids.

Short profit margins (brought on by tough competition), changes in distribution channels, and the need for consumer education are problems which plague the industry. Groups of wholesalers are employing private labels which tend to confuse the end user. "The industry has to do more about informing the buyer of the merits of the tool—its reliability and what it will do—so the purchaser can justify paying the prices asked," says one sales manager.

• **The Future**—One large producer of portable electric tools believes the industry has substantial prospects for

growth. Among the challenges: Keeping pace with the changing pattern of markets; continuing research and development of new products; testing new methods and materials for tool applicability; aggressive merchandising.

The population boom, accelerated industrialization of world markets, increasing family incomes, and added leisure, all promise future expansion of the toolmakers' markets.

• **Innovations** — Developments in portable electric tools range from improvements in basic categories to the introduction of entirely new tools. John Oster Mfg. Co., Milwaukee, offers a double action sander, that, through the twist of a key, produces an orbital action for standard finishes, or a straight line action for superfine finishes. Skil Corp., Chicago, has announced a two speed reciprocating saw for cutoff or patternwork. Tested on 1 in. steel bar stock at 1000 strokes per minute, it made a burrfree cut in 23 seconds. Milwaukee Electric Tool Corp.'s Sawzall buzzes along at 2250 strokes per minute and has an assortment of 49 blades for use on any material.

Attracting attention is Black & Decker Mfg. Co.'s cordless electric drill which can be used miles from any power source. (See photo.) The Towson, Md., manufacturer plans to market the 4 lb tool this fall. It has a self-contained energy source which combines a series of power cells with a radically different, efficient, totally enclosed motor. Performance factors: The tool will drill seventy five, ½ in. holes in ¾ in. fir before it needs re-energizing. The power cells can be recharged 400 times. Black & Decker says it would require several months of idleness for the power cells to run down completely. A quick charge can be given in 5 hours.

• **New Features**—Other manufacturers have incorporated bubble levels in drills, put wood splitting devices and eyeshields on saws, introduced antiratcheting screw drivers for production assembly operations, brought out electric hammers with self-rotation, added garden tools.

Drills and saws continue to be the top sellers. Among other popular items are sanders-grinders, hammers, screw drivers, and shears.

A $20 billion market is involved in the . . .

U. S. Race to the Moon

PRESIDENT KENNEDY'S State of the Union message last month committed the U. S. to a race to the moon with the USSR. Conservatively, the race means $20 billion will be spent by the National Aeronautics & Space Administration (NASA) in the next five years. It could cost twice that much. NASA's budget for fiscal 1962 under Ike was $1.1 billion in new appropriations. (Appropriation money represents orders the agency can let during the year, not actual spending.) The President added $300 million in March. His message last month adds another $550 million, for an NASA budget of almost $2 billion.

The programs most affected by the President's decision to land a man on the moon by 1967:

- Apollo, a spacecraft scheduled to circle three men around the moon. The fiscal 1962 budget for it is $160 million.
- Nova, a huge booster for launching a manned expedition to the moon. More than $100 million is authorized for it in the new fiscal year.
- F-1, North American Aviation Inc.'s liquid fueled, 1.5 million lb thrust engine.
- Communications satellites. The fiscal 1962 program calls for about $95 million.
- Weather satellites. NASA's budget is $50 million. The weather bureau will get authorization for another $56 million.
- Rover, the NASA-Atomic Energy Commission atomic rocket. Almost $60 million is scheduled for it.

The latest addition to NASA's budget is, of course, subject to Congressional approval, but most legislators appear willing to go along with President Kennedy. The House, before the President's message, had authorized a NASA budget increase of about $125 million.

• **Military Requests**—The President also asked Congress to O.K. more space money for the Defense Department: $62 million for a solid fuel booster program and $15 million to develop a launch vehicle following the design of the Titan II ICBM.

Other additions to the defense budget will be made for conventional weapons like helicopters, armored personnel carriers, and howitzers to support the Army's airborne brigade concept. About $200 million is asked for that. The military assistance program for our allies overseas will be boosted by $250 million. That money is for nonnuclear weapons too.

Civil Defense, especially the shelter program, is expected to receive another $200 million; Ike had requested $100 million. The program will go to Congress soon, but its likelihood of success is doubtful. The legislators have been unwilling to go along with huge expenditures for shelters in the past.

• **New Space Studies**—Forecasting the needs of NASA over the next 20 years, Martin Co. has begun work on a $75,000 study contract for three basic space missions:

- To land three men on the moon and return them immediately.
- To keep them on the moon 30 days.
- To establish a permanent moon base for 10 to 12 men.

NASA has also awarded the first contract in the commercial space communications field: Radio Corp. of America will spend $3 million on Project Relay, an active satellite for sending messages around the world. Related development: Communications Satellites Inc. has been formed by General Electric to guide a joint venture by nine firms in commercial space communications.

The Federal Communications Commission is expected to establish regulations soon for the commercial use of space. The GE program is designed to avoid monopolization of space communications by one firm.

President Kennedy: "If it's possible for the Defense Department to put more emphasis on small business, we should go ahead . . ."

Defense Secretary McNamara: "I believe we can do a better job of implementing the department's policies covering small business participation . . ."

Senator Smathers: "Instructions have been given to the service secretaries for a 10 per cent increase in prime contract awards to small business . . ."

Small Firms: Bigger Cut of Defense Pie

THE ADMINISTRATION has committed itself to giving small firms at least another $600 million in defense contracts in fiscal 1962. Two weeks after entering the White House, the President fired off a memo to Defense Secretary Robert McNamara noting criticism from Congress, particularly Sen. George Smathers (D., Fla.), chairman of the Senate Government Procurement Subcommittee.

Secretary McNamara replied that he was taking these steps:

Assigning responsibility for the department's small business program to Graeme Bannerman, deputy assistant secretary of defense for procurement.

Alerting service secretaries to emphasize the administration's interest in small firms.

Ordering a review of sole source procurement.

Seeking greater opportunities for set-asides of contracts for small business.

Encouraging prime contractors to eliminate sole source subcontracting.

Establishing close working relations with the Small Business Administration.

In fiscal 1960, small firms received 16.1 per cent of the dollar volume of prime contract awards. That amounted to $3.4 billion. In fiscal 1962, noting the rising trend of defense business, the administration estimates small business should get $4 billion worth of prime contracts, an increase of $600 million.

Small firms in metalworking can figure their share of this potential $4 billion market at $2.8 billion, because about 70 per cent of all prime contract awards are hard goods.

● HOW TO DO IT—How can the Defense Department promise to raise small business participation in defense? The answer, say Defense sources, is to "break out" components for them. Under the weapon system concept, a missile, including all its support, is built by one major firm—which, in turn, subcontracts components. What Defense hopes to do: After the weapon becomes operational and standardized, it will break out some components and allow all interested firms a chance to bid on them.

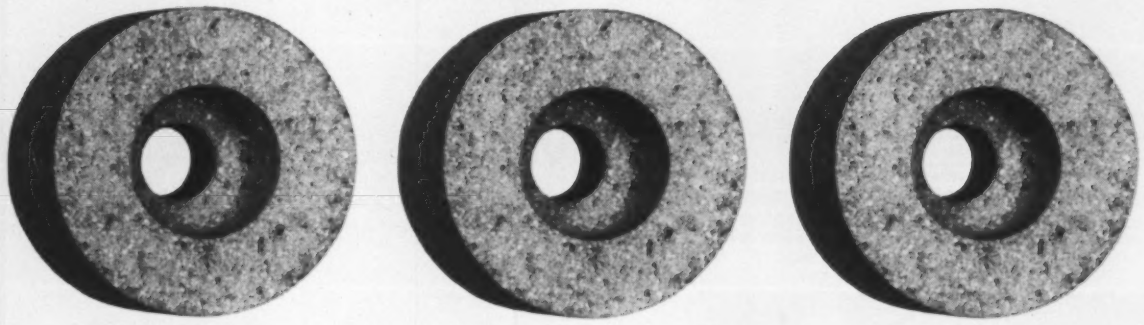
The Army will send every small firm on its technical service bidders list a "presolicitation notice" on each procurement, asking if the firm is interested.

The Navy will make detailed analyses of its contractors make or buy decisions to see if more work can't be made available to small firms.

The Air Force will attempt to establish its requirements sufficiently in advance of the start of procurement to allow contracting officers more time to pull out potential small business awards.

The space program is also being geared to allow small companies more opportunities. The National Aeronautics & Space Administration reports that 16 per cent of its contract dollars go to small business. The space agency is publishing (in the Commerce Department's "Daily Synopsis") all unclassified research contracts with a value of $100,000 or more. It tells small firms where to find subcontracting opportunities.

POSITIVE DUPLICATION—EVERY TIME!



Each one of these kernels of corn has positive duplication built into it, just as have these internal wheels, and *all* CINCINNATI Ⓟ° GRINDING WHEELS. There are good reasons for this Ⓟ dependability . . . 36 good reasons.

FAMOUS, UNIQUE PROCESS

Three dozen unvarying quality controls govern every step of the famous Cincinnati Ⓟ manufacturing process, unique in the industry.

For example, the atmosphere of the mold room is *climate controlled* with conditions of temperature and humidity that *remain the same* from hour to hour, from day to day, from year to year!

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Factory trained by the Cincinnati Milling Machine Company, our grinding specialists are available to you for consultation on all your grinding problems. Call your CINCINNATI GRINDING WHEELS Distributor, or contact us direct, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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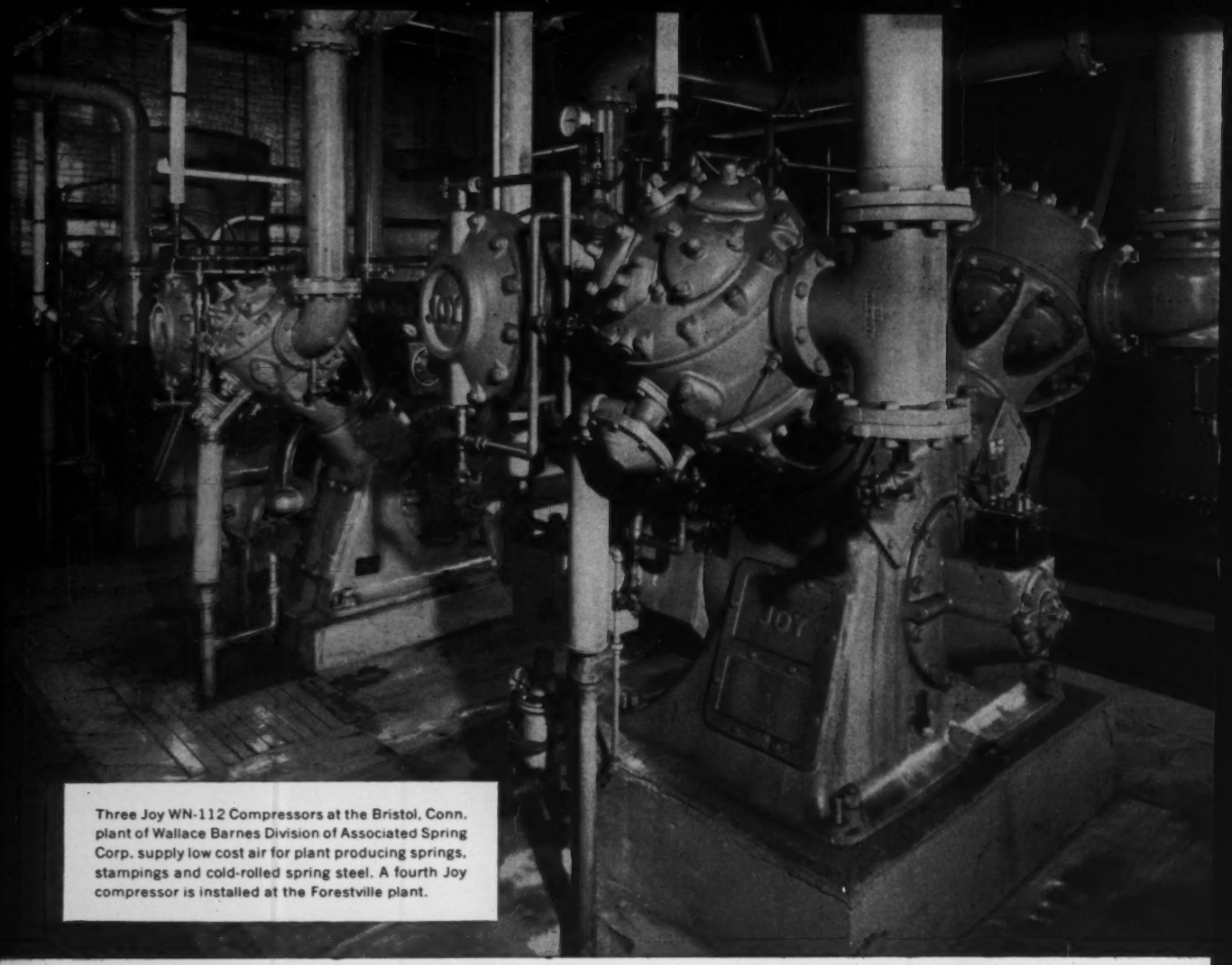


Three Joy WN-112 Compressors at the Bristol, Conn. plant of Wallace Barnes Division of Associated Spring Corp. supply low cost air for plant producing springs, stampings and cold-rolled spring steel. A fourth Joy compressor is installed at the Forestville plant.

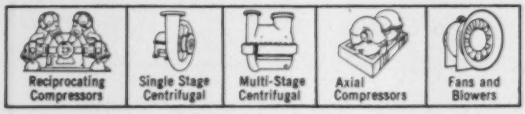
Four JOY Compressors in service a total of 54 years at Wallace Barnes—only $1161 in repair parts and service

Four Joy WN-112 Compressors at Wallace Barnes Division of Associated Spring Corp. have a remarkable service record, which has resulted in extremely low cost plant air. The four machines have a total of 54 years in service, in a three shift operation, yet repair parts and labor have totaled only $1161. According to the operator, maintenance amounts to changing the oil periodically and occasionally replacing a valve part. Total capacity of the compressors is 3500 cfm.

Performance like this is remarkable, even for Joy compressors, and depends upon adequate care of the machines. However, you can count on low maintenance and a high degree of reliability from any of the Joy compressors.

Consult your Joy representative whenever you want low cost air. Reciprocating Compressors in both standard and oil-free construction are available from 15 to 1250 hp; Centrifugals and Axial Compressors from 15 to 15,000 hp. For complete details on the Joy WN-112's, write for Bulletin 3205-72.

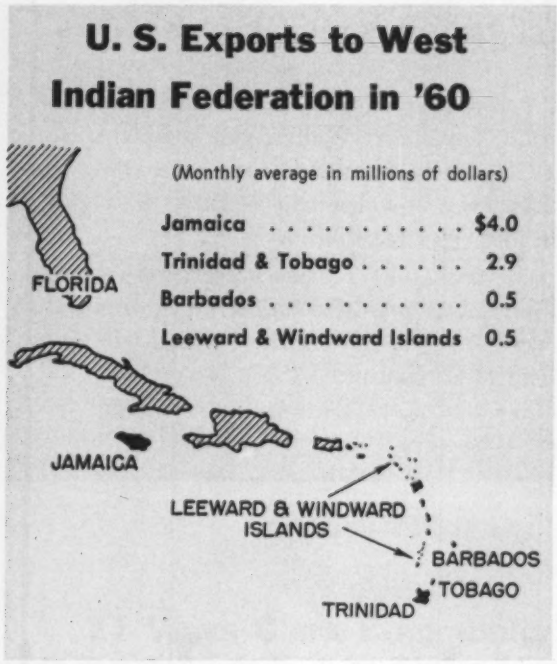
AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario


U. S. Exports to West Indian Federation in '60
(Monthly average in millions of dollars)
Jamaica $4.0
Trinidad & Tobago 2.9
Barbados 0.5
Leeward & Windward Islands 0.5
FLORIDA
JAMAICA
LEEWARD & WINDWARD ISLANDS
BARBADOS
TOBAGO
TRINIDAD

West Indies Called Untapped Market for U. S. Products

A DEPARTMENT OF COMMERCE trade mission to the Caribbean area views the British West Indies (Barbados, Jamaica, Trinidad, and the Leeward and Windward Islands) as a new and untapped market for U. S. goods. In the metalworking field, good demand is reported for refrigeration and air conditioning equipment, electrical appliances, and industrial machinery.

Normal competitive factors and a preferential tariff favoring British Commonwealth products are the only barriers of consequence to U. S. products. And the tariff wall may soon fall. The region will gain independence this year as the Federation of the West Indies. However, many observers expect the federation to maintain commonwealth status.

The federation (population: 3 million) imported nearly $1.2 billion worth of goods in 1959. Last year, imports from the U. S. averaged $7.9 million monthly. Steel imports totaled 100,000 tons.

The mission reports opportunities to provide plant facilities and technical assistance in a number of industries, including production of iron and steel shapes.

The mission also says British Guiana, Surinam, Caracao, and Aruba are keenly interested in U. S. goods, particularly consumer durables and electric appliances. In British Guiana, tariffs favor commonwealth goods, but U. S. products compete on equal footing with foreign manufactures elsewhere in those areas.

Points to Watch in Latin Dealings

Five points to bear in mind when considering doing business in Latin America are suggested by Harold Blancke, president, Celanese Corp. of America, New York:

"1. The Latin American countries are not underdeveloped, except in the economic sense. They are old countries with established cultural and social traditions. Their peoples have deep national pride and while wanting a better life, they react violently against anything smacking of colonialism or exploitation.

"2. While their economies now depend largely on commodities and primary products, Latin Americans greatly need and want to develop their own domestic manufacturing industries.

"3. U. S. companies wishing to do business in these countries must conform, as foreigners, to Latin American traditions and methods.

"4. Latin American businessmen welcome genuine offers of co-partnership where the local stake in money and management is substantial. They demand more than a token interest.

"5. No U. S. business can safely or successfully enter Latin America as a trader in search of quick profits with minimum involvement in local affairs. An industrial missionary concept is needed to become part of the local scene."

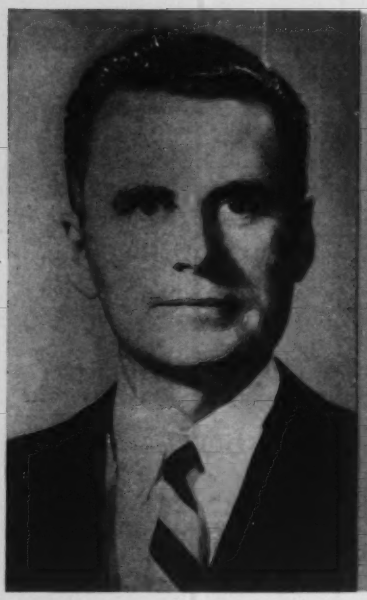
Japanese, Aussies Develop Ore, Coal

Japanese steelmakers, lacking domestic raw material sources, are taking a major step to assure a continuing supply of coal and ore for their busy mills. They are investing millions of dollars in the development of mineral deposits in Australia. The move will enable Australian firms to mine new areas of West Australia and Queensland.

Negotiations are underway for the development of the Kianga-Moura coal field in central Queensland. Target: Exports to Japan of 1 million tons a year by 1965. If production builds up as expected, a major coal loading plant will be installed at Gladstone to serve 30,000 ton, Japanese bulk carriers.

Large iron ore tonnages are bound for Japan from deposits at Mt. Goldsworthy and Tallering Peak in West Australia. Proposals call for the export of 1 million tons of ore annually for 15 years from the Mt. Goldsworthy region, which has estimated reserves of 31 million tons. Prospecting is being conducted in the Taroom-Gayndah area of Queensland.

Early last month, the first overseas sale of ore was culminated since the lifting of Australia's 22 year old ban on iron ore exports. More than 200,000 tons of high grade ore are slated for Japanese blast furnaces from deposits near Grafton, New South Wales.



"For communications to be effective, you must target specific objectives"

"We have found that employees complain about lack of information," says Bert Walter, vice president, Clark Equipment Co. "They want to know what's going on—the state of business, management decisions which affect them, their jobs, and families.

"We believe that if employees are given the facts about the serious, competitive nature of business, they will make their own sound decisions which will be fair and beneficial to all concerned."

How to Get Communications on Target

LIKE THE GOLDEN RULE, good communications is more preached than practiced.

"Effective communications takes the same diligent planning as other corporate programs—sales targets, cost cutting campaigns, or profit goals," stresses Bert Walter, vice president-industrial relations for Clark Equipment Co., Buchanan, Mich. "Specific objectives, the medium or method to be used, timing, and audience to be reached should all be mapped out in advance."

When communications is treated as an expedient or fire fighting tool, you'll hear complaints like these:

- "Cost cutting campaigns missed the mark because communications broke down."
- "How can we hit profit targets when we're dumping $30,000 a year into an employee newspaper that stresses bowling, babies, and banquets instead of getting our message across?"
- "The foreman should know better. Get them all in here immediately and explain the facts of life to them before the whole plant follows Department A out the door."

• **Specifics**—Clark Equipment recently mapped its communications program for the next 24 months. In addition to detailing programs supporting general corporate activities, officials have also targeted two special areas:

1. Labor contract improvements—the company has 24 different plant locations in which contracts must be negotiated within the next two years.

2. Employee attitudes—an employee attitude survey completed last December pinpointed several target areas for improvement.

"We feel that waiting until negotiations start before explaining the thinking and reasons behind the company's new contract proposals is poor timing," explains Mr. Walter. "By that time, the union has outlined its proposals, and has taken a firm stand. Getting the employee to be logical and objective toward company proposals becomes difficult at best."

• **Some Tips**—What kinds of targets can a company set for its labor relations program when aided by realistic communications? Mr. Walter suggests:

- Revision of arbitration provisions.
- Streamlining grievance procedures.
- Realigning seniority provisions.
- Changing incentives systems.
- Modifying contract language to conform with NLRB rulings or court cases.
- Eliminating certain clauses and topics from the contract.

Examples of objectives include: Elimination of the annual improvement factor in contracts—experience shows that such a procedure is not realistic and that adjustments should be made on an interim basis as warranted. Another: Establish seniority for supervisors who may be shifted in and out of the bargaining unit because of fluctuations in production and employment levels.

• **Employees Speak**—Clark Equipment's employee attitude survey pinpointed these problem areas:

1. Two plants had morale problems. While 97 to 98 per cent of the employees at the other plants reported Clark is "a good place to work," only 67 per cent of the employees in the "poor morale" plants thought so.

2. Officials felt that too many employees reported that Clark did not provide enough opportunities for advancement—but a spotcheck revealed 40 per cent of the employees had been promoted or received merit increases in the prior year.

3. The chief gripe among all plants was "poor communications" about what's going on in the departments and plants.

• **Diagnosis**—Both of the "poor morale" plants involve operations which have been affected by company expansions. In one (at Spokane, Wash.), the plant was the headquarters for Brown Trailer Inc. before it was acquired by Clark. After it became a division, the corporate offices were moved to Michigan City, Ind.

"Understandably, the people in Spokane feel like 42nd cousins," relates Mr. Walter. "They want to feel in on things. Our recommendations: Supervisors should hold short weekly meetings with employees; give them more information about other plants; promote a spirit of competition among other Brown Trailer plants."

In the other plant, other activities had been moved to new locations within the company, cutting that plant's work force by nearly 50 per cent. Job security is the big fear. These people want to know what the future holds. Recommendations: Stepped up communications with employees via supervisors, use of bulletin board programs, more management newsletters to the employee homes.

• **Procedure**—Though Clark's corporate industrial relations staff develops the master communications program—setting objectives, determining the types of media or methods to use, and pinpointing the timing and audience to be reached—execution of the program depends largely on plant and branch managers, Mr. Walter stresses.

"Like many firms," he emphasizes, "when we analyzed our communications program, we found we were employing most of the usual media and techniques (see checklist). We were not using them to best advantage."

• **Good Newspaper**—The Clark executive is a firm believer in the use of employee newspapers or magazines for other than reporting recreational activities and personal items about employees. *Clark News*, a bimonthly employee magazine, holds such news to reasonable proportions. A substantial part of the 18 to 24 page magazine is devoted to business information about the plants—new products, order volume, and key programs within the company as they affect the employees.

The editors also tackle topics in the political areas—such as Michigan's tax and financial plight. Special stories of interest to employees, such as a series on "The Law and You" and "Financing a Home," are presented.

In mapping out its communications program, Clark doesn't overlook outsiders. "A company has definite responsibilities in the communities in which its plants are located," Mr. Walter points out. "We feel communications programs should include objectives in this area. Our program includes newspaper advertisements, plus letters and other media directed to community thought leaders—clergymen, businessmen, elected officials, and civic leaders."

11 Ways Clark Communicates

- **Orientation program for new employees.**
- **Booklets, handbooks on first aid, safety, supervisor guides, company products.**
- ***Clark News*—bimonthly employee magazine.**
- **Management newsletters mailed to employee homes.**
- **Special situation letters—such as reports during labor negotions.**
- **Plant bulletin boards.**
- **Supervisor-employee meetings.**
- **Community newspaper advertisements.**
- **Management-supervisor meetings.**
- **Plant Family Days.**
- **Annual reports.**

Depreciation Reform: Too Little, Too Late?

THAT QUESTION was posed by Everett M. Hicks, president, National Machine Tool Builders' Association, at the organization's meeting in Washington.

Mr. Hicks, vice president and general manager, Machine Tool Div., Norton Co., Worcester, Mass., reminded his audience that the U. S.:

1. Leads the world in the development of machine tools.
2. Is supplying a dwindling percentage of tools to world markets.
3. Has more obsolete equipment now than at any time since the 1930s.
4. Is utilizing only a fraction of its machine tool capacity, while other nations are operating at full capacity and have large backlogs.
5. Permits the lowest rate of depreciation of the eight major Free World industrial nations.

• **Observation** — "It's possible," suggested the NMTBA president, "that we are making the mistake of taking medicine to relieve our symptoms (obsolescence) without making a thorough diagnosis of the disease.

"We all want to stimulate growth of our economic system, but I believe we need to reflect on what conditions are necessary for growth under a private enterprise system. As manufacturers, we all know our greatest demand for machine tools and other capital equipment comes at a time when there is a general confidence in the future of our economy and when people are forecasting growing markets for present products and broadening markets for new products. Free decisions to invest are made by free men who risk their savings when they believe a satisfactory return can be realized in the form of profit.

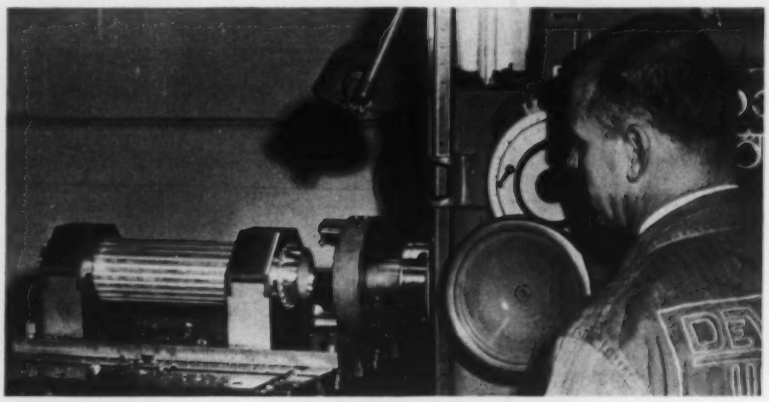
"At a time when our industry and many others are losing their ability to compete in the world markets because of high costs, it would seem we should diagnose carefully the reasons for these high costs if we are to find the cure."

• **Reform a Must**—Mr. Hicks feels that depreciation reform is a must. "We are gratified to find (an) awareness in the administration of the crucial problem of obsolescence in U. S. industry. Various members of our industry have been striving for many years for improved depreciation allowances to encourage modernization, and in our opinion, our current state of obsolescence is, to a large extent, attributable to our archaic depreciation policies. We promise to continue our support for these new administration programs."

• **Inflation Control Too**—Focusing on the problems of high costs, Mr. Hicks warned: "If we are to attain low costs, we must not only modernize our equipment, but, equally important, we must find a way to stop our inflation, giving the other countries of the Free World a chance to catch up with us costwise, so that we can again compete in Free World markets.

"Government fiscal policy has an important influence on inflation, and those of us who believe the control of inflation is vital to our continued prosperity are concerned about some of the programs we see."

Mr. Hicks said that, while many of the proposed programs of government spending may have individual appeal, "isn't it time we reviewed this from an over-all standpoint and decided, in view of world-wide competitive pressures, we cannot afford to go further toward a welfare state?"

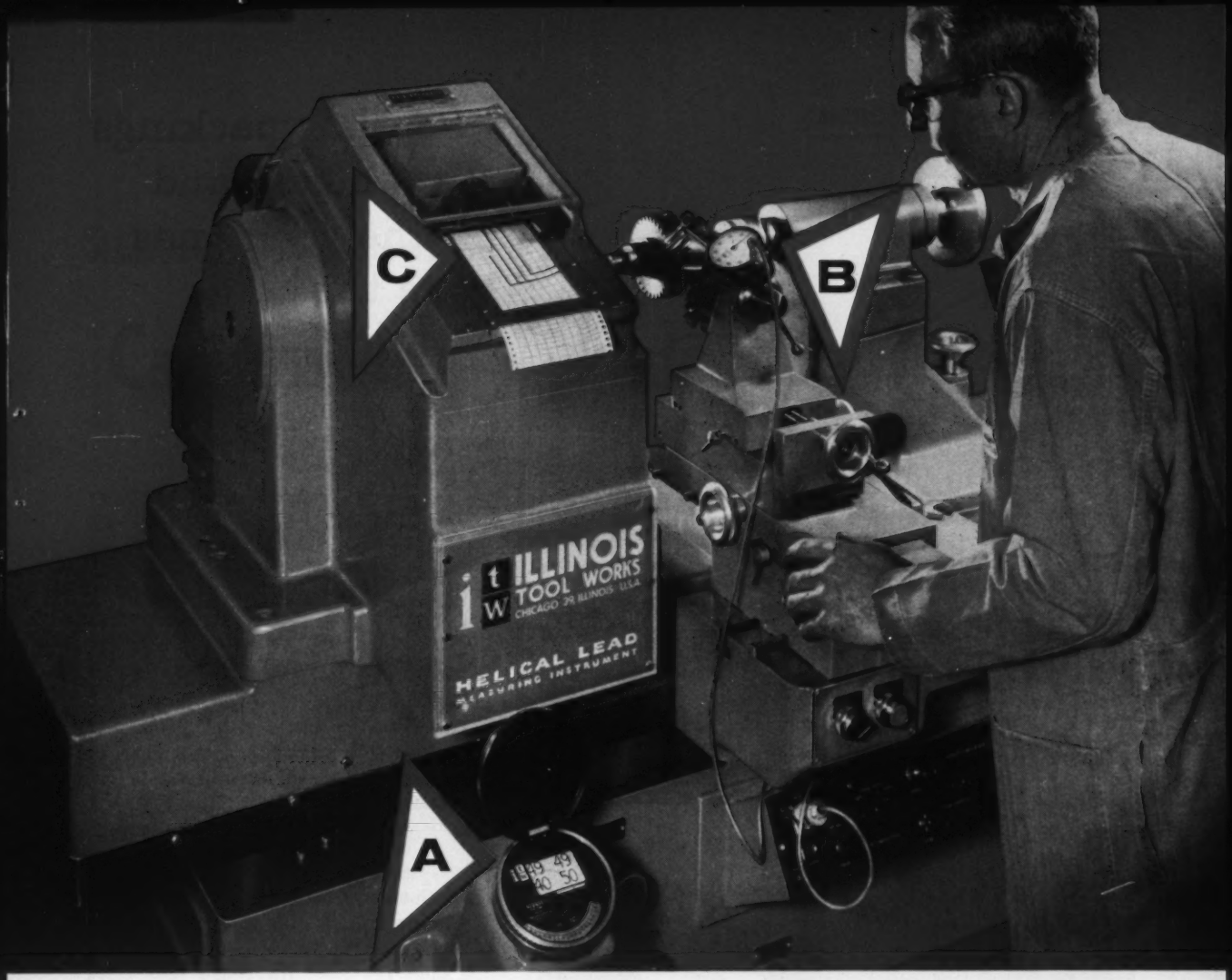


Part Redesign Slashes Costs

TIME REQUIREMENTS have been pared from 4 to 5 hours down to 13 minutes in the forming of the control turret shown above. The savings are the result of shifting to extruded aluminum stock and redesigning the control sleeve part and dogs that make up the turret.

The part is used on horizontal boring machines made by DeVlieg Machine Co., Royal Oak, Mich. Turning of the drum, as shown, is handled on a Jigmil as a boring operation, now a 13 minute job. A combination Microbore tool does the turning, facing, and centering. Only one setup is involved, with the work simply being turned on the table, after the first end is completely machined.

The company says the cost of the turret assembly, a memory element for depth control of the spindle and rapid traverse, makes spares feasible—so a user can leave the multiple dogs set up and simply switch drums on the machine (rather than reset the dogs for each job).



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P3

Aluminum engine designers are asking . . .

Can Cast Iron Cylinders Be Dropped?

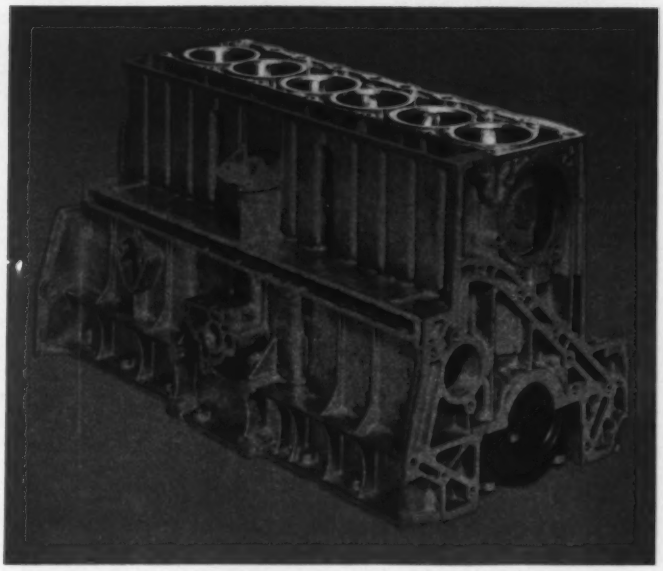
DON'T DISCOUNT the possibility that gray iron cylinder liners for aluminum engines may be replaced by aluminum liners or some form of coating applied directly to the cylinder walls.

The feeling is strong around Detroit that such an advance is needed if aluminum engines are to compete successfully against cast iron. Detroit planned to build 1.2 million of the lightweight powerplants this year, but the figure is expected to be closer to 600,000. And it looks like production won't be much more than that in 1962.

As matters now stand, Ford shows no serious interest in aluminum engines. Chrysler is unhappy about its aluminum powerplant.

At GM, Chevrolet will bring out its new, standard engine family in gray iron. The latest reversal for aluminum is the gray iron V-6 that General Motors' Buick Div. has released for rush tooling to meet 1962 production deadlines. It will be used optionally with the 155 hp, aluminum V-8 that's now standard for Buick Specials and Oldsmobile F-85s. The Pontiac Div. never has been entranced with the lightweight engine for its compact Tempest. It prefers its own four cylinder, cast iron job. Only Rambler and Corvair people seem to be satisfied with aluminum.

Engine designers admit that iron liners seem to be the best answer so far. They cost 12 to 20 cents a pound installed. The use of metallurgical and mechanical bonds has virtually eliminated hot spots in the bores caused by shrinkage between liners and block walls. The cast liners can also be rebored easily and need no special lubricants.



- **460,000 aluminum engines have been installed in 1961 cars.**
- **They contain 36.8 million lb of aluminum castings.**
- **And more than 6.9 million lb of cast gray iron cylinder sleeves.**

But gray iron promotes scuffing and ring wear. It adds manufacturing steps and calls for careful quality control. The biggest liability is weight. The iron liners add 14 to 18 lb to aluminum engines. That's about a fifth of the total weight of the block. Unless economies in weight and manufacturing costs can be found, it looks like little can be gained by a material switch.

But automakers have sizable investments in aluminum engine facilities, so they eagerly look for any answer that will help them maintain amortization schedules. Engineers agree that from design and cost standpoints it would be preferable to eliminate cylinder liners. From panel talks at sessions of the Society of Automotive Engineers in St. Louis, it's evident that interest

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in the cylinder liner project has been revived.

• **Basic Methods**—SAE panel members said the most workable approaches are chrome plating, sprayed metal coatings, and the use of hypereutectic, high silicon aluminum. Most of the methods are used in smaller engines—outboard motors, chain saws, and for aircraft. In some cases, the coatings are applied to aluminum liners, but, usually, only one or two cylinders are involved, so they're cast as separate units anyway.

To work satisfactorily, any of the coatings must be hard enough to provide long wear, but they can't be so fine grained that special lubricants are needed.

• **Chrome Plating**—Other materials have been tried to plate cylinders, but chrome deposits have worked best. The material is highly wear resistant, and its thickness can be easily controlled. It needs no machining, but plated bores can't be rebored to take oversize pistons.

Probably the best known automotive application is the chrome plated cylinders for the air cooled Porsche engine. In discussing it with SAE members, Louis W. Raymond, president, Superior Plating Co., Fairfield, Conn., reported: "We have examined Porsche cylinders run over 100,000 miles which were in excellent condition. None of the upper ring groove wear (found) in iron and iron liner engines was present."

Superior is one of the larger chrome-on-aluminum platers in this country. Mr. Raymond points out that good lubrication is achieved by controlling the chrome deposition, so it will produce a network of small cracks in the surface which act as oil reservoirs. Although the method is generally considered the most expensive way to coat cylinders, Alfred K. Wood, Superior sales engineer and co-author of the SAE paper, tells STEEL that in volume production costs would be comparable with cast iron liners. He admits automakers have shied away from plating after a few failures, but he thinks that part of their reluctance stems from lack of experience with the process. He suggests joint development efforts, adding: "We don't like to see any progress held up because of a few failures."

• **Aluminum Alloys**—There are two basic approaches to the use of aluminum alloys, says Norman Smith, development engineer, Aluminum Co. of America. One way is to coat the piston with wear resistant materials. The other method employs hypereutectic aluminum with 13 to 26 per cent silicon content for the cylinders or for cylinder liners.

Chrome plating is the most common coating for pistons. Mr. Smith says 10 million plated pistons have been made for 2½ to 3 hp engines. So far, he admits, no engines with untreated aluminum bores are in production. One problem is that special lubricants are needed to avoid seizures. Although that approach is the least costly, considerably more work must be done to develop the best alloys for automotive use.

• **Spray Coating**—Molybdenum by itself or coupled with a sprayed steel layer seems to be the most successful material for spray coating cylinder walls. The spray method offers many of the advantages of plating—and at less cost. Lubrication isn't much of a problem, but the bores usually must be impregnated with sealer to avoid internal galvanic corrosion. Surface finish is rougher and generally requires a grinding operation.

Until recently, it was felt that molybdenum coated cylinders probably would be the next step in going from gray iron sleeves to plain aluminum bores. But at the SAE meeting, Doehler-Jarvis Div., Toledo, Ohio, National Lead Co., revealed details of its transplant method which can be used only with diecasting.

Instead of spraying the cylinder walls after casting, Doehler-Jarvis sprays a rough coating of steel or iron particles 0.020 in. thick on the cylinder diecasting cores. During the casting cycle, the molten aluminum penetrates into the pores of the spray deposit and creates an interlocking bond that's said to be as strong as the physical properties of the two materials. The company says only a slight honing is needed to finish the cylinders. The method does away with the need for liners and cuts out costly manufacturing steps. It can be easily automated into the casting cycle. One source says it may cost less than cast iron liners.

Says A. F. Bauer, Doehler-Jarvis engineering vice president: "The transplant coated bore of a cylinder barrel with 3.25 in. ID can be mass produced with a tolerance of ±0.003 in. and with a surface smoothness of only 15 rms. For practical purposes, the coefficient of thermal expansion is the same as that of the aluminum alloy used for casting the block." Mr. Bauer indicates the method will be used in the production of a small, air cooled engine this year.

U. S. Auto Output

Passenger Only

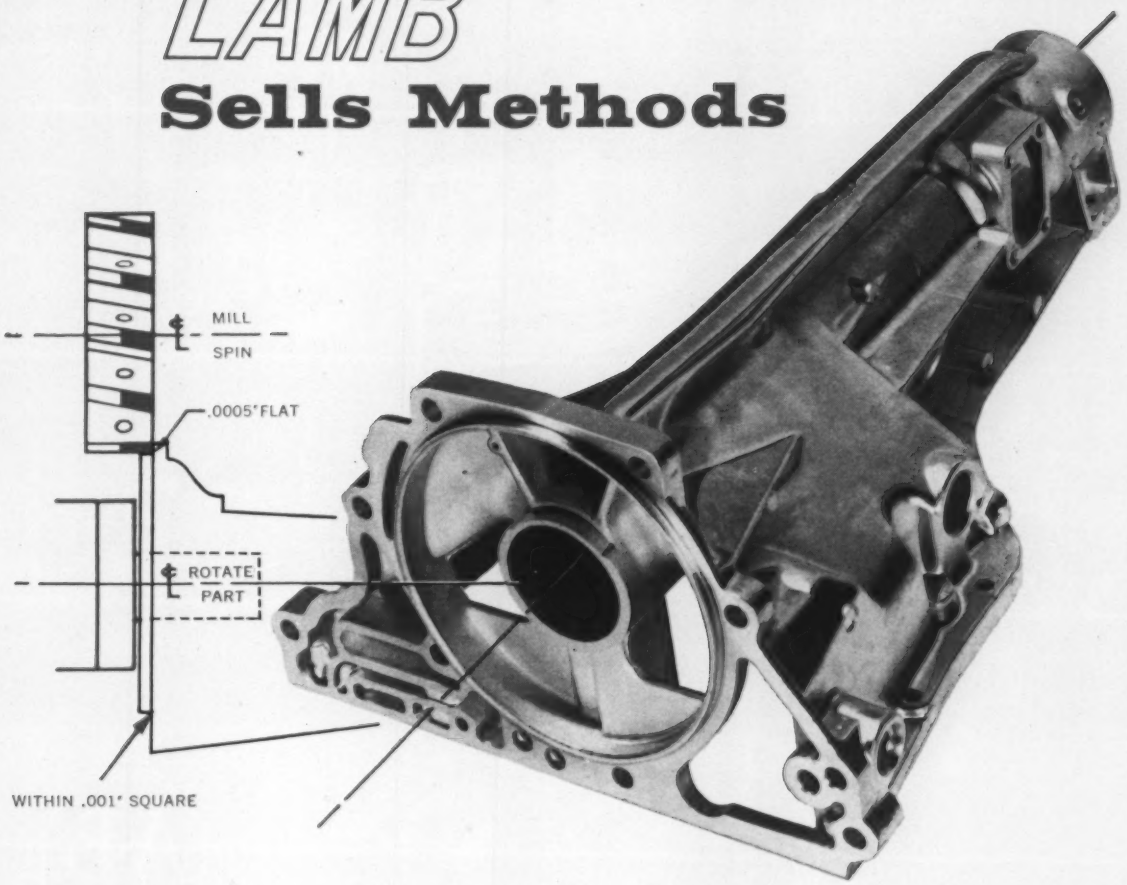
	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
5 Mo. Totals	2,177,243	3,196,358
May	542,303	611,260
June	.....	613,136
July	.....	434,377
August	.....	305,514
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108
Week Ended	**1961**	**1960**
May 6	124,454	142,091
May 13	129,402	145,917
May 20	123,528	154,755
May 27	129,142	142,359
June 3	85,077†	115,068
June 10	130,000*	139,423

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

S-P Studies Fuel Cells

Although the fuel cell appears to be a long way off as a power source for cars, more automakers are researching it. Latest to enter the field is Studebaker-Packard Corp. It's Onan Div., Minneapolis, which makes electric generating equipment, has opened a technical center where basic fuel cell research will be carried on. C. W. Onan, division president, says operating efficiencies up to 80 per cent are possible through the continuing conversion of chemical energy into electrical energy.

LAMB
Sells Methods



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45 station palletized transfer machine

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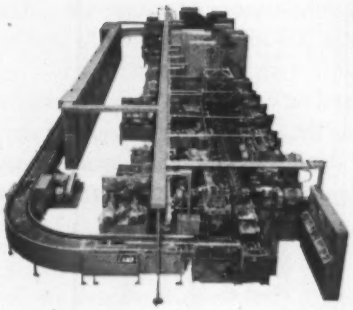

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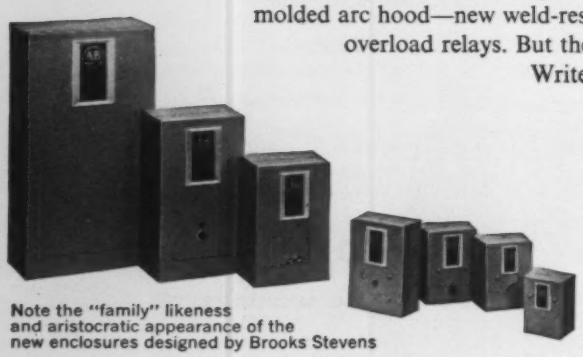
a complete NEW family of Bulletin 709 Motor Starters

the greatest advance in motor control in 30 years

From their amazing compactness to their almost unbelievable operating life—measured in *millions* of operations—this entire family of Bulletin 709 solenoid starters is *new in every detail.* They feature a new, patented, high-efficiency magnet—new molded coil—new hot molded arc hood—new weld-resistant contacts—and new truly *trip-free* and *tamperproof* overload relays. But these new starters use the old Bulletin 709 heater elements. Write today for all the details on this really amazing new line of Allen-Bradley Bulletin 709 motor starters.



Note the "family" likeness and aristocratic appearance of the new enclosures designed by Brooks Stevens

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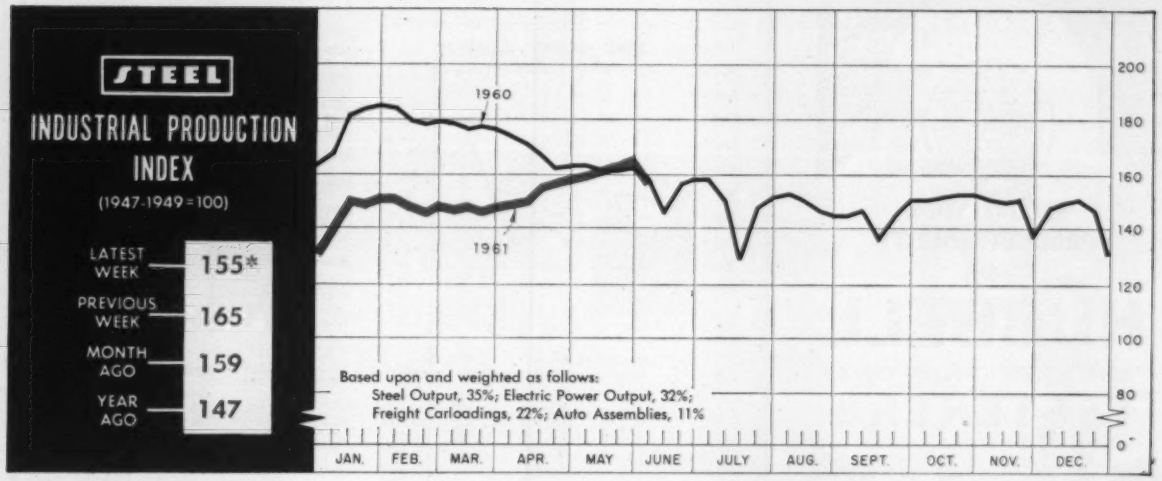
Quality Motor Control

Allen-Bradley Co., 1320 S. Second St., Milwaukee 4, Wis.



*Week ended June 3.

Fuse Lit for Capital Spending Boom?

THIS BUSINESS RECOVERY is likely to be a whopper, especially in the capital goods sector. It could be the most vigorous upturn of the postwar era.

So claims Walter Maynard, partner, Shearson, Hammill & Co., New York investment firm. He told the Cleveland Society of Security Analysts: "The reasoning behind this rather optimistic expectation is that in the coming two years we are unlikely to witness the kind of actions that kept our economy under wraps during 1959 and 1960." He noted three actions in particular:

1. The extraordinarily long steel strike which took more of a toll in every sector of the economy than many persons realized.

2. The drastic tightening of money, which caused the unprecedented upward swing of all kinds of interest rates.

3. The big turnaround in the government's budget position from a deficit of more than $13 billion in fiscal 1959 to a slight surplus in fiscal 1960.

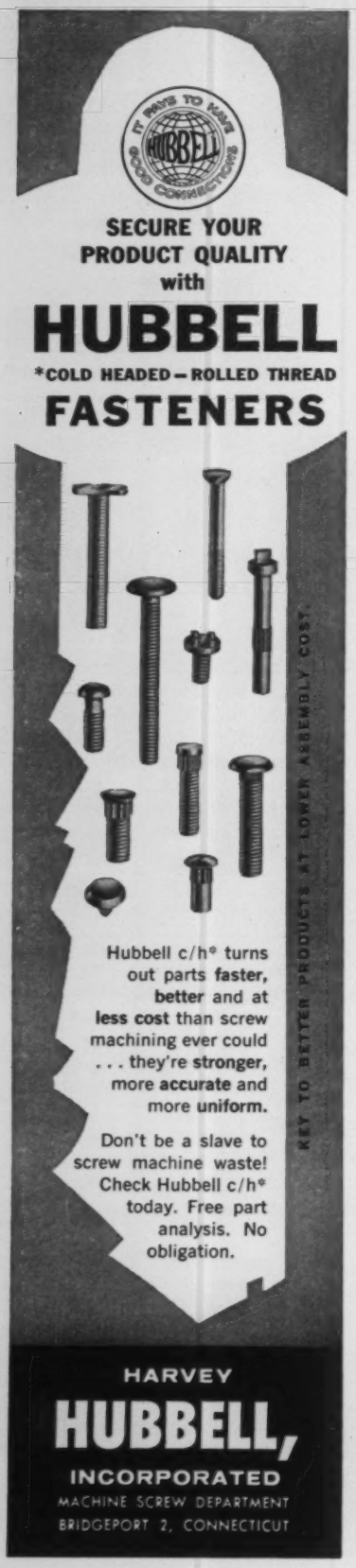
• **Big Push**—The most significant aspect of his forecast to metalworkers: "The probability that we will have a full-fledged capital goods boom" such as we haven't seen since the post-Korean period. For one thing, he looks for a further rise in wage costs, triggered by the pattern of the auto wage settlements later this summer. "This rise . . . will, of course, tend to bring its own solution through an increase in demand for labor saving equipment." Also, the absence of the disturbing factors mentioned above will permit the economy to function normally, "which in turn should lead to an acceleration in our apparent growth rate."

He claims that manufacturing companies are in a good position to make this advance. While he describes the fall in profit margins as a normal result of competition which we must learn to live with, he further notes that even during

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,030[1]	2,052	1,726
Electric Power Distributed (million kw-hr)	14,000[1]	14,390	13,503
Bituminous Coal Output (1000 tons)	7,990[1]	7,740	8,575
Crude Oil Production (daily avg—1000 bbl)	7,000[1]	7,054	6,815
Construction Volume (*ENR*—millions)	$399.9	$400.0	$648.0
Auto, Truck Output—U. S., Canada (*Ward's*)	110,599[1]	161,305	147,951
TRADE			
Freight Carloadings (1000 cars)	525[1]	579	574
Intercity Truck Tonnage (changes from year ago)	−1.1%	−0.9%	−1.8%
Business Failures (Dun & Bradstreet)	368	303	299
Currency in Circulation (millions)[2]	$32,055	$32,001	$31,811
Dept. Store Sales (changes from year ago)[2]	−1%	+6%	+14%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,272	$29,169	$23,890
Federal Gross Debt (billions)	$289.9	$289.1	$289.2
Bond Volume, NYSE (millions)	$18.0	$28.2	$24.4
Stocks Sales, NYSE (thousands of shares)	11,797	19,235	14,591
Loans & Investments (billions, adjusted)[3]	$112.0	$112 8	$102.7
U. S. Govt. Obligations Held (billions)[3]	$31.2	$31.4	$25.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	222.4	222.3	231.2
All Commodities[6]	118.9[1]	118.9	119.4
Commodities Other than Farm & Foods[6]	127.8[1]	127.8	127.8

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.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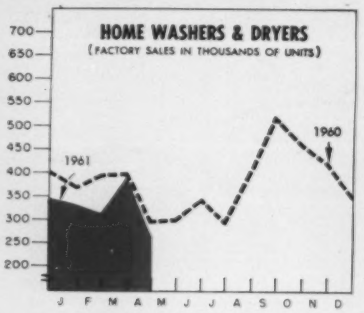
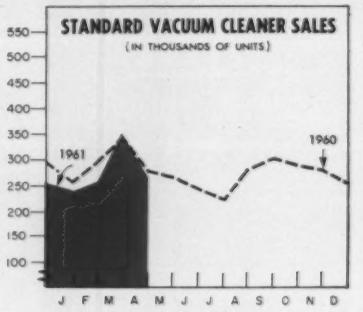
THE BUSINESS TREND



	Washers		Dryers	
	1961	1960	1961	1960
Jan.	228,919	254,900	103,158	111,600
Feb.	227,562	283,900	81,340	108,400
Mar.	305,590	306,000	82,093	90,200
Apr.	209,695	236,200	46,042	53,200
May	.....	244,200	.....	53,700
June	.....	277,300	.....	64,900
July	.....	217,700	.....	72,600
Aug.	.....	296,500	.....	105,100
Sept.	.....	352,700	.....	165,500
Oct.	.....	305,800	.....	151,900
Nov.	.....	275,300	.....	142,000
Dec.	.....	223,500	.....	119,200
Totals	.....	3,274,000	.....	1,238,200

American Home Laundry Mfrs. Assn.
Charts copyright, 1961, STEEL.



	1961	1960	1959
Jan.	242,515	258,330	242,516
Feb.	257,930	294,483	271,396
Mar.	349,972	339,918	346,557
Apr.	265,032	278,391	317,402
May	.....	265,556	257,345
June	.....	245,790	275,974
July	.....	223,008	221,232
Aug.	.....	280,575	268,165
Sept.	.....	301,935	305,096
Oct.	.....	290,059	330,899
Nov.	.....	280,550	290,130
Dec.	.....	254,631	293,818
Totals ..	.....	3,313,226	3,420,830

Vacuum Cleaners Mfrs. Assn.

the recent recession, the profits of more than 3000 corporations tabulated by the First National City Bank of New York increased by 2 per cent last year. (Those companies account for more than 90 per cent of all corporate earnings.)

"There is a reasonable degree of assurance under present circumstances that there are in fact many good opportunities for investment in our economy. Those opportunities will be accentuated in the coming year by the near certainty that all of the important indexes will achieve new high ground before another 12 months is out," Mr. Maynard declared.

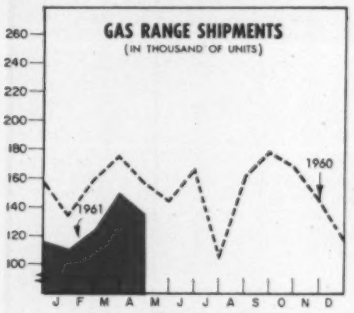
• **Metalworking Favorites**—Among the industries in which he sees such opportunities is capital goods, including makers of the heaviest kind of energy producing and chemical process equipment. Heavy truckmakers also should see "a number of years of record prosperity." He also sees good years ahead for the steel industry—companies will reach new highs in earnings (and presumably in production). "If heavy industry is to prosper, then the railroads will prosper too." That could mean more spending for freight cars if the industry follows its tradition of buying heavily only when it is making good profits.

Mr. Maynard also sees a rising demand for shell homes and mobile homes, important markets for metalworking products.

Optimism Begets Optimism

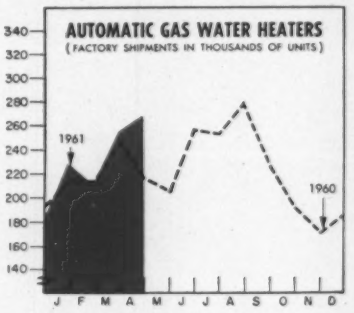
Such optimism is not hard to find these days. A group of industry and bank economists meeting in Cleveland last week agreed almost unanimously that the Federal Reserve Board's index of total industrial production would average 116 (1957 = 100) in the fourth quarter. It was 105 in April. That would be a rise of about 14 per cent from the trough reached last February. It would be one of the fastest recoveries (ten months) of the postwar period.

For gross national product, the group forecasted an annual rate of $525 billion to $535 billion, with a median of $532 billion—vs. a $499.8 billion annual rate in the first quarter. The economists said the big turn in the inventory account of GNP is now taking place. They predicted either a neutral or a slight plus in the second quarter—vs. a decumulation rate of $4 billion in the first quarter.



	Shipments—Units 1961	1960	1959
Jan.	114,800	133,400	148,700
Feb.	124,800	159,300	152,400
Mar.	150,800	174,800	171,300
Apr.	136,300*	156,500	165,800
May	.....	145,500	160,400
June	.....	166,500	171,000
July	.....	105,700	143,800
Aug.	.....	162,800	176,400
Sept.	.....	178,600	210,500
Oct.	.....	169,000	195,000
Nov.	.....	144,400	159,900
Dec.	.....	117,900	157,100
Totals	.....	1,814,300	2,012,300

*Preliminary.
Gas Appliance Mfrs. Assn.



	Shipments—Units 1961	1960	1959
Jan.	229,300	215,500	266,200
Feb.	210,400	214,800	259,700
Mar.	255,000	247,300	265,900
Apr.	268,300*	216,200	261,300
May	.....	205,500	239,300
June	.....	256,000	250,000
July	.....	254,100	245,100
Aug.	.....	279,400	256,100
Sept.	.....	227,600	243,800
Oct.	.....	192,900	274,200
Nov.	.....	171,400	199,100
Dec.	.....	185,500	192,900
Totals	.....	2,666,200	2,953,600

*Preliminary.
Gas Appliance Mfrs. Assn.

A little over two months ago, STEEL's Panel of Economic Consultants (which includes some of the Cleveland group) estimated the FRB index for the fourth quarter would reach only 108 (median) and GNP would hit an annual rate of $520 billion. The highest estimate for the production index at that time among the panelists was 117—for GNP, it was only $530 billion.

Not only is the recovery being recognized at an unusually early stage, but it is also fairly widespread. For instance, the Federal Reserve Bank of Minneapolis and the Federal Reserve Bank of Cleveland report that the uptrend is gaining momentum.

The index of business activity for New York state is only 1 point under the corresponding 1960 level.

Since late in April, the index of business activity for the Pittsburgh district has gained over 10 per cent.

Upturn Still Isn't Universal

But the upturn so far has not caught hold across the board. For instance, the charts and tables above indicate that the appliance industry, which had a moderately good first quarter, started the second quarter considerably under the year ago level. Some of the downturn was seasonal, but most manufacturers' sales are lower than expected.

However, there is guarded optimism within the industry that the worst is over. In a survey of producers by the Institute of Appliance Manufacturers, 16 of 18 top executives said they expect the second half to top the corresponding period of 1960. Many also said the uptrend will be strong enough to carry 1961 above the 1960 mark. Only two officials indicated that sales in the last six months would be equal to or below those of the year ago period.

H. L. Travis, sales vice president, Kelvinator Div., American Motors Corp., said the upturn should be about 10 per cent. "Appliance industry inventories are in good condition, and there is little sign of a significant deterioration of prices."

Less optimistic is Richard S. Burke, president, George D. Roper Corp.: "General conditions show signs of definite improvement, but the appliance industry does not. Conflicting trends within the industry are hard to measure, but they may neutralize each other for a breakeven second half."

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Production line strapping of tin plate coils

Packaging of tin plate coils is now on a production line basis in speed and low cost. Fast, dependable Signode air power tools take ¾″ and 1¼″ steel strapping from the dispenser, eliminating the waste of cut-to-length strap. Overhead tool suspension systems and engineered dispensers add mobility and save more time and effort. Engineered installations by Signode save time and money. Write for more information. Ask for free copy of "Air Power Tensioners and Sealers."

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LEWIS J. BURGER
LeTourneau-Westinghouse pres.

JOSEPH F. KNIGHT
Kaiser Refractories v. p.

WALTER C. BASS
American Pulley president

CRUSE W. MOSS
Willys executive v. p.

Lewis J. Burger was named president of **LeTourneau-Westinghouse Co.**, Peoria, Ill. He succeeds **Merle R. Yontz**, who resigned the presidency and joined Caterpillar Tractor Co. Mr. Burger was with General Electric Co. in various management capacities.

Donald F. Kittredge was made assistant vice president, International Div., **National Malleable & Steel Castings Co.**, Cleveland. He was sales manager in New York for the Transportation Products Div.

Henry W. Jones III was elected president of **AT Electronics Inc.**, New Haven, Conn., newly formed subsidiary of American Tube Bending Co. **Henry W. Jones Jr.** was named chairman and treasurer. **Carl von Allmen** was made chief engineer; **Joseph P. Dynia** assistant to the president with duties involved with purchasing and cost estimating; **Robert L. Noonan** production superintendent of plant operations.

Joseph F. Knight was appointed vice president-operations for **Kaiser Refractories Div.**, Kaiser Aluminum & Chemical Corp., Oakland, Calif. He has been manager of operations for the division since 1955.

Walter C. Bass was elected president, **American Pulley Co.**, Philadelphia, division of Van Norman Industries Inc. He was executive vice president and director of sales.

John R. Harkness fills the new post of vice president-marketing for **Librascope Div.**, General Precision Inc., Glendale, Calif.

John E. Aldeborgh was elected executive vice president, **Standard Gage Co. Inc.**, Poughkeepsie, N. Y. He was vice president-sales.

Bruce L. Mims, vice president, was made general manager of a new division at **Barden Corp.**, Danbury, Conn., which will design, manufacture, and market precision mechanisms.

Cruse W. Moss was named executive vice president of **Willys Motors Inc.**, Toledo, Ohio. He will direct all operations of the company. He was vice president-sales.

Bertram S. Parker was elected president of **Youngstown Foundry & Machine Co.**, Youngstown. He succeeds his father, **B. G. Parker**, now chairman.

Fred R. Ellenberger was elected vice president - international operations, **Worthington Corp.**, Harrison, N. J. He succeeds **S. Riley Williams**, who continues with the company as vice president-consultant.

Phillip H. Booth succeeds **Lewis V. Kuhnle**, retired, as manager of carbon bar, rod, and wire sales, **Youngstown Sheet & Tube Co.**, Youngstown. He continues to handle sales of alloy bars.

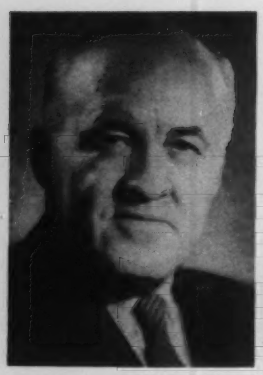
George F. Howard joined **Ex-Cell-O Corp. of Canada Ltd.**, London, Ont., as production manager. He has been associated with Canadian

HENRY W. JONES III
AT Electronics president

JOHN E. ALDEBORGH
Standard Gage exec. v. p.

BRUCE L. MIMS
heads new Barden div.

GEORGE F. HOWARD
joins Ex-Cell-O (Canada)



D. A. MILLIGAN

J. P. CODY

J. I. Case marketing posts

CLARENCE C. HANSON

JAMES K. McLAUGHLIN

Ajax Magnethermic promotions

Westinghouse Ltd., and Thompson Products Ltd.

J. I. Case Co., Racine, Wis., named **D. A. Milligan** to the new post of general manager-marketing and product development; and named **J. P. Cody** general sales manager, Industrial Div. **R. P. Meyers** replaces **D. H. Mitchell**, resigned, as industrial Eastern division manager. **J. R. Haley** replaces Mr. Meyers as North Central regional manager.

James M. Kennedy Jr. was made assistant chief engineer, **Revere Copper & Brass Inc.**, New York. He was chief engineer, Rome, N. Y., Div.

Alex J. Romanski was elected vice president - operations, **Michigan Chemical Corp.**, Detroit.

John S. Kline was named director of general services for **Carpenter Steel Co.**, Reading, Pa. He is succeeded as general manager, Alloy Tube Div., Union, N. J., by **Barclay Morrison.**

Clarence C. Hanson, former vice president-sales, was promoted to vice president and general manager of the Trenton, N. J., Div. of **Ajax Magnethermic Corp.**, in charge of the Induction Melting Equipment Div. **James K. McLaughlin** was made vice president in charge of the Youngstown Div.

Sol Levine was appointed executive vice president, **Landers, Frary & Clark**, New Britain, Conn. He was vice president-operations.

International Business Machines Corp., New York, appointed **Jerrier A. Haddad** to vice president and assistant general manager, IBM Data Systems Div. He is succeeded as general manager, Advanced Systems Development Div., by **George A. Kennard.**

Dr. L. T. Boatwright Jr. was appointed director of engineering for **Sparton Southwest Inc.**, Albuquerque, N. Mex., subsidiary of Sparton Corp. **J. Alan Stewart** was appointed general manager of **Sparton Electronics,** Jackson, Mich., division of Sparton Corp.

George L. Green was elected vice president-marketing for **Pullman-Standard Div.**, Pullman Inc., Chicago. He succeeds **T. P. Gorter,** who continues with the company as a vice president-sales.

Edward J. Sherwood was elected vice president - sales, **Youngstown Steel Car Corp.**, Niles, Ohio. He was sales manager.

Capt. Sheldon W. Brown (USN, ret.) was made manager of **Aerojet-General Corp.'s** Atlantic Div. at Frederick, Md.

Donald W. Keirn was made assistant manager of plate, structural, and bar sales for **Kaiser Steel Corp.**, Oakland, Calif.

William E. Campbell was named manager of **Reynolds Metals Co.'s** aluminum reduction plant at Troutdale, Oreg. He succeeds **V. G. Kneeskern,** recently promot-

JOHN S. KLINE

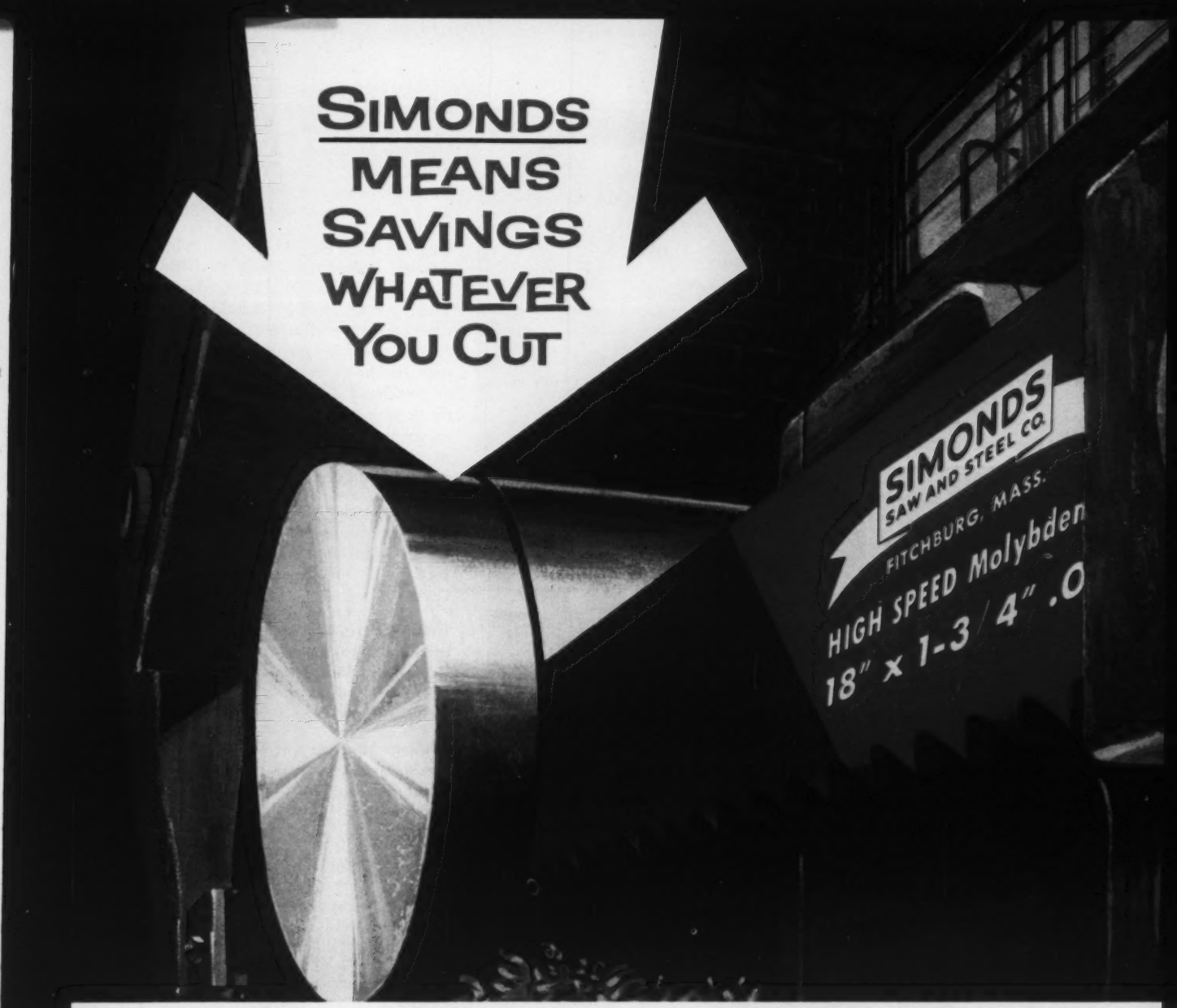
BARCLAY MORRISON

new posts at Carpenter Steel

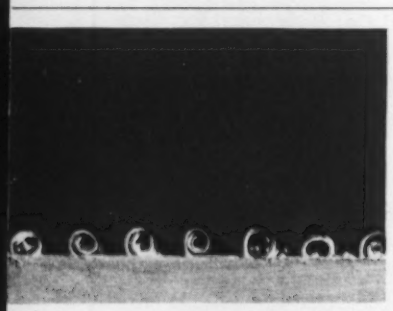
DR. L. T. BOATWRIGHT JR.

J. ALAN STEWART

Sparton Southwest, Sparton Electronics posts



"Ups" your cut-off capacity . . .
SIMONDS "RED END" Hacksaw Blades



Simonds tough, edge-holding "Red End" Blades don't hack at metal, but cut curled chips like the cutting tool on a lathe. Made to rigid, high quality standards, they have greater resistance to breakage . . . step up your cut-off capacity.

Longer wearing, too, Simonds own unique cross-rolled steel and special heat treatment add many valuable hours of cutting life to every blade . . . provide important savings all along the line.

Simonds "Red End" Power Blades come in All-Hard and Shatter-proof types in all standard lengths, thicknesses and tooth spacings. Three types of Hand Blades are available in all standard specifications . . . insure a "right" blade for every need.

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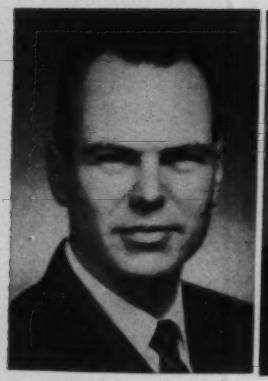
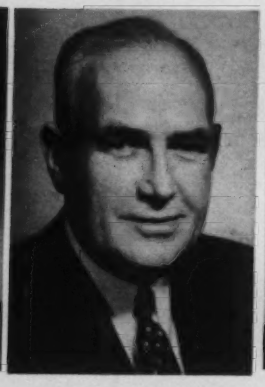


EDWARD W. P. SMITH
Bendix-Westinghouse post



GUY J. COFFEY
Chicago Pneumatic chairman

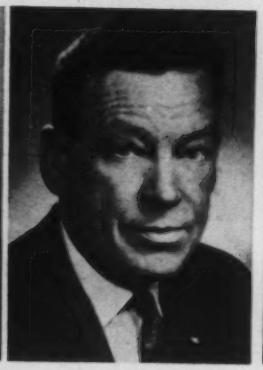
WILFORD BEASLEY
Birtcher/Indus. Div. eng.

IRVING CHARM
Control Industries post

WILLIAM MAGNESS
Luria Bros. v. p.

WALTER STRAND
Merkle-Korff president

RALPH H. ISBRANDT
American Motors v. p.



WILLIAM J. ZUBRISKY
Chromium Corp. president

GEORGE J. PEER
Basic gen. sales mgr.

ed to assistant general manager, Reynolds Reduction Div.

Ralph H. Isbrandt was elected vice president - automotive engineering and research, **American Motors Corp.**, Detroit.

Jerry Leary was elected executive vice president, **Cincinnati Steel Castings Co.**, Cincinnati.

William J. Zubrisky, former executive vice president, was elected president and chief executive officer of **Chromium Corp. of America**, New York. He succeeds **Donald H. Bissell**, now chairman.

George J. Peer was made general sales manager, **Basic Inc.**, Cleveland. He was sales manager, Furnace Products Div.

Edward W. P. Smith was made director of purchases, **Bendix-Westinghouse Automotive Air Brake Co.**, Elyria, Ohio. He succeeds **Howard R. Hafferkamp**, retired. He has been purchasing analyst since 1960.

Guy J. Coffey was elected chairman and chief executive officer of **Chicago Pneumatic Tool Co.**, New York. He succeeds **H. Arnold Jackson**, who will continue as chairman of the executive committee. **Norman Readman** succeeds Mr. Coffey as president. He was managing director of overseas operations for the company. **Carra L. Lane** was elected vice president and manager of plant operations.

Wilford Beasley was appointed chief engineer, Industrial Div., **Birtcher Corp.**, Monterey Park, Calif. He was with Hoffman Electronics Corp.

Irving Charm was appointed corporate chief engineer-quality control for **Control Industries Inc.**, Inwood, N. Y. He was director of design for Noma Electric Co.

William Magness was elected a vice president in charge of the Research & Engineering Div. of **Luria Bros. & Co. Inc.**, New York, a division of Ogden Corp.

Walter Strand, former vice president-general manager, was elected president of **Merkle-Korff Gear Co.**, Chicago. **John Simms** was elected vice president.

OBITUARIES...

Charles C. Gordon, 67, founder and chairman, **Sterling Bolt Co.**, Chicago, died May 19.

Harrison E. Graffin Jr., 60, sales manager, Alloy Bar Div., **Bethlehem Steel Co.**, Bethlehem, Pa., died May 29.

George M. Ullom, 55, Birmingham district sales manager, **Harbison-Walker Refractories Co.**, died May 13.

W. F. Schupp, St. Louis district sales manager for **Republic Steel Corp.**, died May 29.

D. A. Shardelow, 59, Detroit district sales manager, **Republic Steel Corp.**, died June 3.

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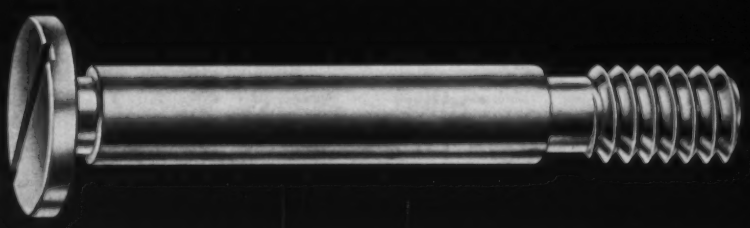
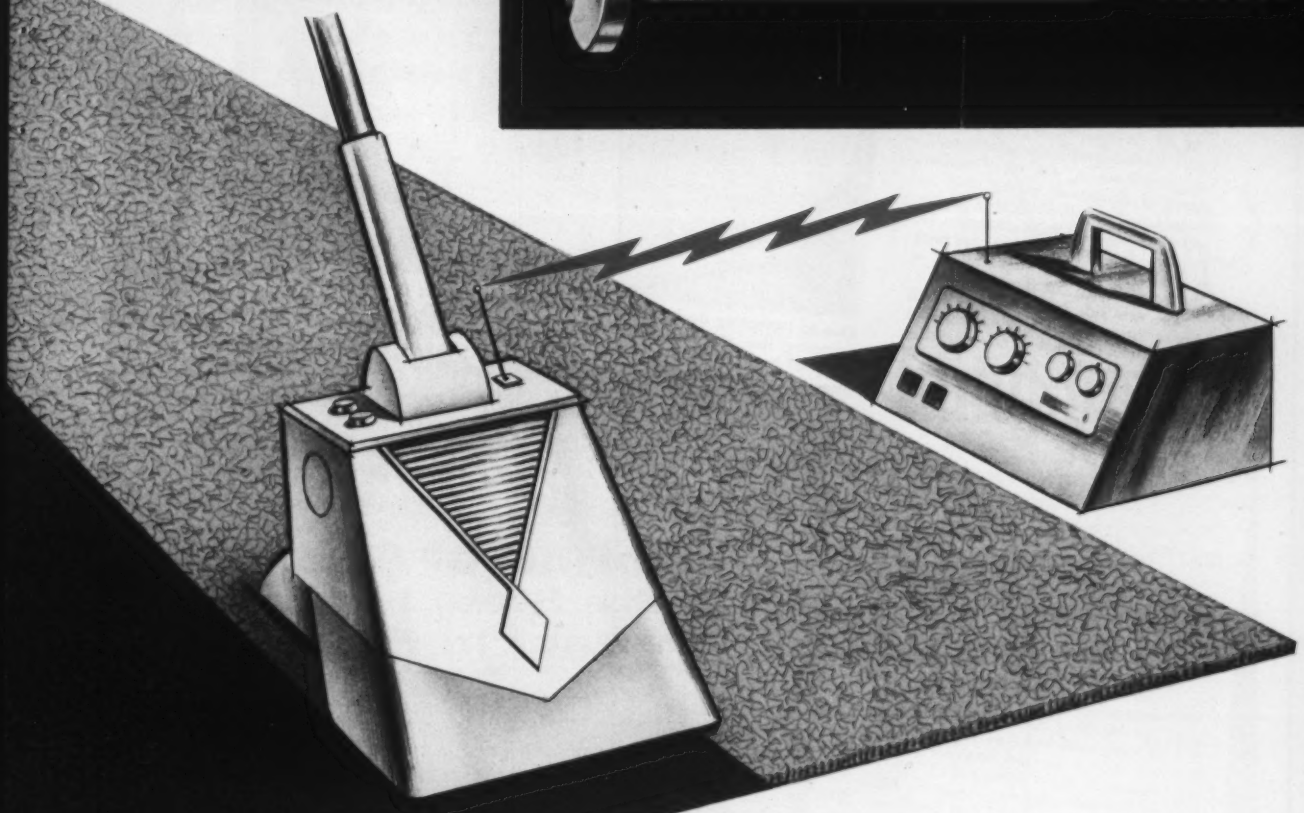
by the
appliance
INDUSTRY





clean sweep for savings

Remote control rug cleaning . . . impossible? We don't think so. In this age of satellites and astronauts we feel that anything can happen and we're betting that it will. Our products, and yours, must reflect the latest and best thinking if we are to continue to compete. This is why many far sighted design engineers are exploring the added savings which result when parts formerly made by the expensive screw machine process are redesigned to run quickly and efficiently on cold headers.

The part shown in the illustration was cold headed to replace a more complex . . . and therefore, more costly . . . screw machine part. If you are seeking ways to produce quality fasteners at less cost and eliminate the material waste and slow production time found in screw machine parts, why not call the man from GLS? Let him show you how we can cold head quality into precision fasteners and give you a *clean sweep for savings.*

GSL

GREAT LAKES
SCREW CORPORATION

EXECUTIVE OFFICES • CHICAGO 27, ILLINOIS

To Meet Customer Demands

New Side Trimming Line Installed In Tin Mill Will Improve Production Of Tinplate In Coils

Installation Called Most Modern Of Type In Industry

A new side trimming line to facilitate the production of tinplate in coils in Weirton Steel's Tin Mill Department was placed in operation recently.

W. H. Wright, Vice President and Chief Engineer, said the new installation, rated among the most modern pieces of equipment in the steel industry, was installed because of the increasing demand from customers for tinplate in coil form. The company will also continue to ship tinplate in the conventional cut sheets.

The new side trimming line, which began operating last month, and a second line, installed on an emergency basis, are used to trim the sides of the sheet steel before it is plated with tin, so it can be wound into coils and be ready for shipment as it comes off the tinning lines.

Mr. Wright explained that Weirton Steel's No. 4 and No. 5 tinplating lines have been equipped with edge control reels which insure that each coil is wrapped with a straight edge. This is necessary to prevent damage to the edges in bundling and shipping and also because straight edges are required when the coils are processed further by Weirton Steel customers.

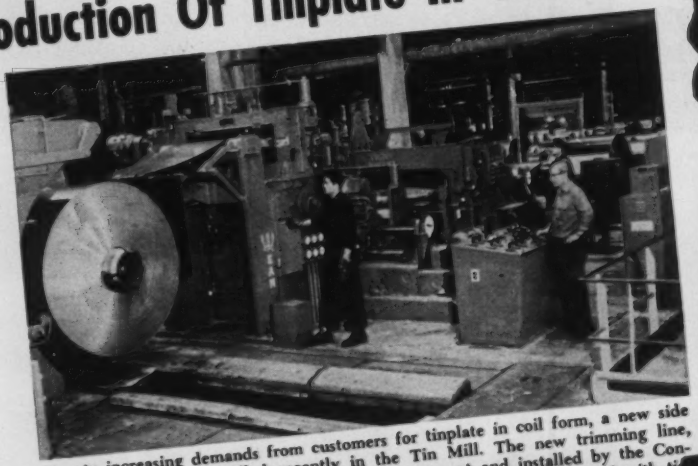
Mr. Wright also reported the installation of a new bundling line, which began operating about three months before the new side trimmer. The bundling line utilizes machinery to wrap coils in heavy paper and fasten them with steel straps. Formerly, this was a hand operation.

The side trimming operation takes place after the steel has been tempered to customer specification by the skin mills and before it is plated with tin. This process eliminates the waste which formerly resulted when the side trimming was done on the cutting lines, after the tinplating process.

The No. 2 side trimming line has a maximum speed of 4,000 feet per minute while the No. 1 line operates at a speed of 1,200 feet per minute. The No. 2 line is able to handle 30-ton coils 85 inches in diameter and 45 inches wide. The line also is equipped with a mash welder, a relatively new operation which provides a smoother weld that does not damage other sections of the coil as it is wound.

All of the new facilities were designed by the Weirton Steel Engineering Department and installed by the company's Construction Department.

Reprinted from Employees Bulletin, Weirton Steel Company, February, 1960



Due to increasing demands from customers for tinplate in coil form, a new side trimming line was installed recently in the Tin Mill. The new trimming line, designed by Weirton Steel's Engineering Department and installed by the Construction Department, [illegible] of sheet steel before [illegible] with tin.

Once again—

proof that GPE Controls is the Steel Industry's "Partner in Progress"

The tin mill side trimming line at Weirton Steel Company, Division of National Steel Corp., was furnished by Wean Engineering Co., and equipped with the industry's most modern edge guide equipment—designed and built by GPE Controls, Inc.

Only GPE Controls offers steel mill edge guides with . . .

★ Non-clogging sensing nozzles with lowest air consumption.

★ Unlimited force output with cylinder pressures to 2000 p.s.i., flows to 140 g.p.m and higher.

★ Variable-gain booster for simple screwdriver job-site matching of control system to speed, coil weight, etc.

Write for NEW Bulletin EG64, which tells all about GPE Controls web guiding systems—and be sure that GPE Controls are specified and furnished on your next strip and tin mill installation.

GPE Controls Model 300 Edge Control, as furnished to Weirton Steel Company.

GPE Controls, Inc.
240 East Ontario Street
Chicago 11, Illinois

GPE Controls

A subsidiary of General Precision, Inc.

Torrington to Build Wire Mill and Bearing Plant

TORRINGTON CO., Torrington, Conn., has launched a $6 million expansion program to provide a wire mill adjacent to its Broad Street plant in that city and a bearing manufacturing plant near Clinton, S. C.

"Both moves are part of a continuing program designed to strengthen the company's competitive position in the bearing field . . ., to reduce costs, and to promote other factors essential to the continued growth of the company," says M. E. Berglund, president.

• **Wire Mill**—The company plans to draw its own wire from rods in a new 43,000 sq ft wire mill in Torrington. The wire will be used in the manufacture of needle rollers and needle bearings. The building will be completed by September and equipment installed during October and November.

• **Bearing Plant**—The Clinton bearing plant will contain 140,000 sq ft of manufacturing and office space. Initial production will include needle bearings and needle rollers for the automotive, farm implement, outboard engine, power tool, and other industries using antifriction bearings. Limited production is expected to begin in midsummer and increase to full capacity as rapidly as employees are trained.

Entirely self-sufficient, the plant will produce all tooling required for its operation. Robert B. Wassung is plant manager at Clinton.

Jacobsen Moving Mowers

Jacobsen Mfg. Co. plans to move (in September) its Worthington Mower Div. from Stroudsburg, Pa., to its main plant in Racine, Wis. The company also operates a plant at Brookhaven, Miss.

Elmes & King Div. Sold

American Steel Foundries, Chicago, sold its Elmes & King Div., Cincinnati, to the Elmes & King Mfg. Co., a newly formed corporation headed by Flug & Strassler Associates, New York. Elmes & King Div. makes machine tools.

Western Electric Expands

Western Electric Co., New York, will start work soon on the erection of a 150,000 sq ft plant addition at its Baltimore Works. The $4 million unit will produce special types of cable for long distance telephone service. New equipment will include wire stranders, plastic extruding machines, and sizing equipment. The unit will get into production around Apr. 1, 1962.

GE Expands Auburn Plant

General Electric Co., Schenectady, N. Y., has launched an expansion program of its Rectifier Components Dept. operation in Auburn, N. Y. Cost: More than $5 million, including $1.7 million for a 70,000 sq ft addition to the plant and the balance for production equipment and facilities. Graydon Lloyd is general manager of the department.

Oberg Forms Division

Oberg Mfg. Co., Freeport, Pa., has formed a new division, Oberg Carbide Punch & Die Inc., to manufacture ASTME standard perforators and die buttons in solid carbide. Prices will be slightly higher than for tool steel. Performance will more than offset the price disadvantage, company officials say.

Howe Sound Broadens Line

Howe Refining Corp., Sewaren, N. J., a subsidiary of Howe Sound Co., has begun production of aluminum additives at its Sewaren plant. The new facility will be managed by John Gehrm and will make products generally known as master alloys and hardeners.

Howe Sound Co., Salt Lake City, Utah, acquired Labeled Metal Products Corp., Chicago, producer of

(*Please turn to Page* 118)

Capacability means

Imagination

When it comes to oxygen furnace refractories, *imagination* is Basic. And, Basic can be your "fountainhead" of new refractory ideas. Take TARBLOK and TARMIX for example.

Six years ago the first U. S. oxygen steel producer looked to Basic for tar-bonded furnace lining refractories. With four years of intensive research behind us, we were ready. Today, Basic is a fully integrated supplier of these materials — shipping to virtually every oxygen steelmaker in the Western hemisphere.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

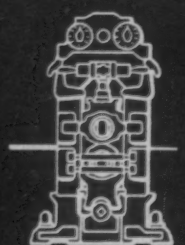
BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

for a mill that can roll back your cost barrier...

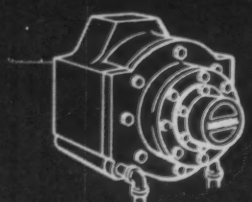
ENGINEERING

COUNSEL

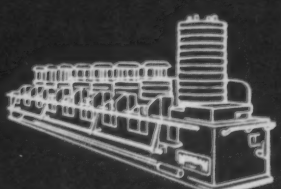
CS2 © MORGAN CONST. CO. Inc.



ROLLING MILLS



MORGOIL BEARINGS



WIRE DRAWING MACHINES

COMBUSTION CONTROL

MORGAN has the take-charge team of design and construction specialists

START UP

ERECTION

Long before foundations go in — long after "design" tonnage is reached — Morgan skills and experience are hard at work to protect profitability in your mill. They smooth the way at every stage of construction with an unmatched depth of technical support; provide tangible savings for every production "turn" with an unparalleled backlog of field-tested mill knowledge. How advantageously this affects operating statements is shown by the impressive list of reorders from Morgan mills round the world.

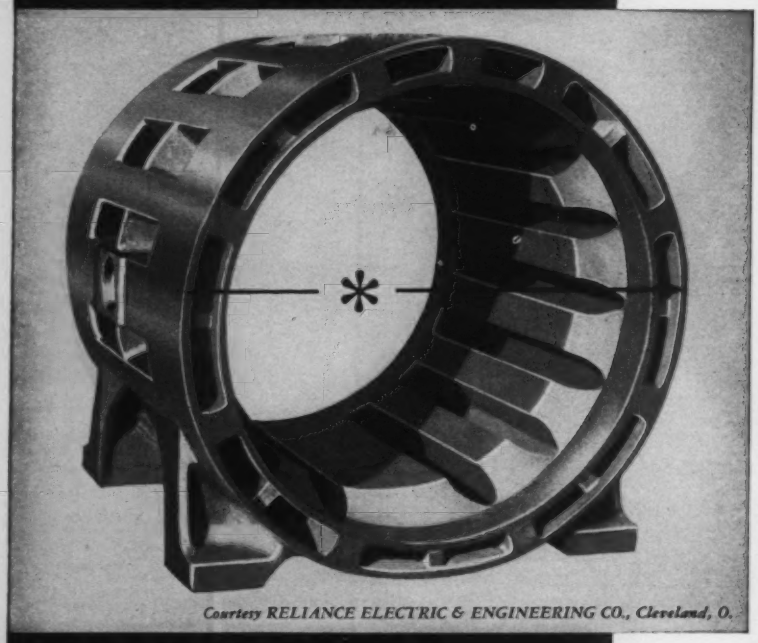
Steel

MORGAN WORCESTER

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

THE KEY NAME FOR PROGRESS IN STEEL-MAKING EQUIPMENT

URICK'S DUCTILE IRON



Courtesy RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, O.

MOTORS . . . . from the Lakes to the Sea

This 1300-pound URICK casting (a fan cooled motor stator frame made to Navy specifications) will withstand extra stress and strain and has better corrosion resistance because it is Ductile Iron. URICK recommends and successfully casts Ductile whenever greater tensile strength and higher impact value are of prime consideration because it has most of the advantages of steel, yet because of its high molten fluidity, it will take intricate shapes not possible with other high strength metals. Other advantages are—Ductile castability permits weight reduction while maintaining required physical properties . . . superior machinability reduces machining time and consequently results in longer tool life. There are other advantages and economies to Ductile when recommended, engineered, and cast by URICK, ask about them.

**This fan cooled motor stator frame to US NAVY specifications is cast in 16 different sizes from 16" to 42".*

Send for Bulletin on URICK's Ductile . . . ask for catalog on URITE gray iron and URICK's facilities, too! Remember, URICK starts with 'U.'

URITE CASTINGS

URICK FOUNDRY

ERIE, PENNSYLVANIA

LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY., INC.

(*Concluded from Page* 115)

metal building products. Howe Sound will operate the property as part of its Rolling Mills Div.

Milwaukee Firm Offers Bonded Lubricant Coatings

Wacho Mfg. Co., Milwaukee, has added facilities for applying bonded, film lubricant coatings to metal and plastic parts as a result of a licensing agreement with Alpha-Molykote Corp., Stamford, Conn., producer of molybdenum disulfide lubricants. Wacho will provide technical assistance and application facilities to manufacturers wishing to prelubricate parts with dry, Molykote, resin bonded coatings.

Fabricator Enlarges Plant

Dietrich Bros. Inc., Baltimore, structural fabricator, is equipping a 5600 sq ft plant addition.

CONSOLIDATIONS

Charles B. Briddell Inc., Crisfield, Md., manufacturer of cutlery, has been acquired by **Towle Mfg. Co.**, Newburyport, Mass., a silversmith firm.

Ducommun Metals & Supply Co. and **Kierulff Electronics Inc.**, Los Angeles, have agreed to merge. Final action is contingent upon favorable tax rulings. Kierulff will operate as a separate entity under its present management.

Stuart Co., Pasadena, Calif., maker of ethical pharmaceuticals, has been merged into **Atlas Chemical Industries Inc.** (formerly Atlas Powder Co.), Wilmington, Del.

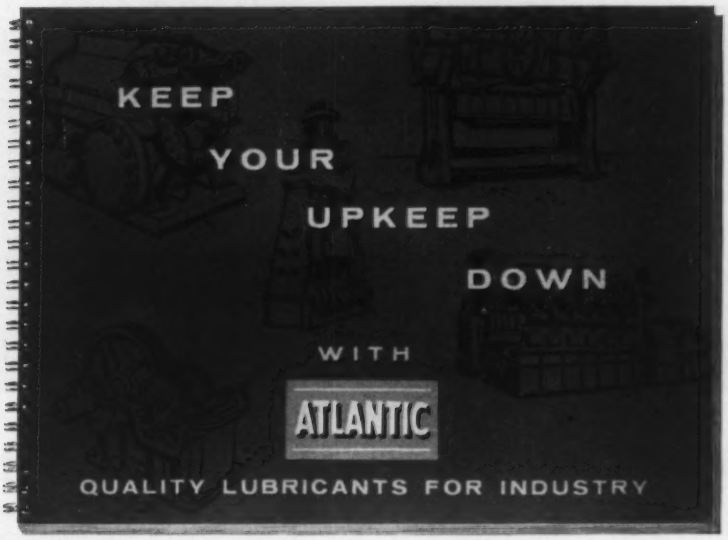
Saramar Industries Inc., Youngstown, acquired Aluminum Fence Co., Cleveland, and moved its operations to Youngstown under the name of Aluminum Fence Co. of America.

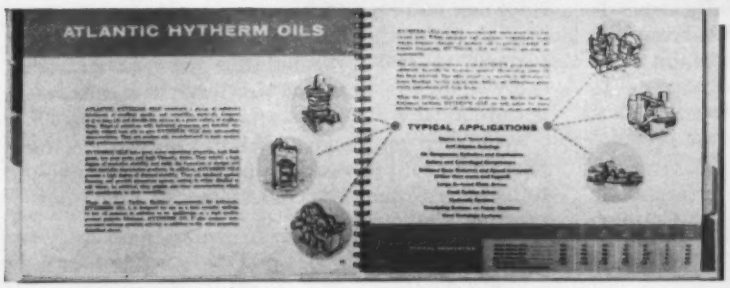
Thiokol Chemical Corp., Bristol, Pa., plans to acquire 85 to 95 per cent of the outstanding voting stock of **Shawnee Industries Inc.**, Shawnee, Okla. Shawnee was formed early this year to acquire the prop-

Free to lubrication engineers and buyers

A NEW 60-page booklet that simplifies selection of the best lubricants for your needs. The Atlantic Refining Company has prepared this handsome new booklet as a modern guide to good lubrication. Called, "Keep Your Upkeep Down with Atlantic Quality Lubricants for Industry," it gives complete information—including typical properties and applications.

For easy reference, the products are classified and color coded according to their basic functions. And of special interest to lubrication engineers is a correlation of lubricant viscosity with speed, radius and clearance, which provides a quick, practical way to determine suitable viscosity for journal bearings. Whatever your lubricant requirements, you're sure to find this comprehensive booklet a useful addition to your reference files. For your free copy, simply write to The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Pa., giving your title and company name. We'll see that your booklet reaches you without delay.





ATLANTIC

THE ATLANTIC REFINING COMPANY • Philadelphia, Pa. • Providence, R. I. • Syracuse, N. Y. • Charlotte, N. C. • Pittsburgh, Pa.

Edmund J. Haar, Chief Engineer of Compressor Plant, Thatcher Glass Mfg. Co., Streator, Illinois, and his new FM-2 compressor.

When you bank on compressed air...

Take a look at an operation that *really* depends on air. At Thatcher Glass Manufacturing Co., Streator, Illinois, compressed air plays vital roles. It supplies process air for glass blowing. It powers practically all of their expensive machines and handling equipment. Reliable air pressure is a *must*.

In a recent expansion of its compressed air plant, Thatcher decided on the new Cooper-Bessemer 600 hp FM-2 compressor shown above. This is one of the fine quality M-Line Series featuring "natural force balance" and recognized everywhere for dependable, low-maintenance performance.

Whatever you make . . . when you want compressed air for processing or power, it will pay you to investigate the Cooper-Bessemer M-Line Compressors. Call our nearest office.

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINES: GAS - DIESEL - GAS-DIESEL
JET-POWERED GAS TURBINES

erties formerly used by Jonco Aircraft Corp., a subsidiary of Fairchild Engine & Airplane Corp. The facilities include about 160,000 sq ft of space and are primarily suited for sheet metal forming, welding, and machining of airplane subassemblies.

NEW PLANTS

Waterbury Farrel Foundry & Machine Co. dedicated its new plant at Cheshire, Conn. Waterbury Farrel, a division of Textron Inc., Providence, R. I., makes cold heading machines, presses, and rolling mills, including Sendzimir mills. Although the new plant contains (314,000 sq ft) about 20 per cent less floor space than the former plant in Waterbury, Conn., its production capacity is about 20 per cent greater.

H. M. Harper Co., Morton Grove, Ill., opened a warehouse at 1920 W. Fourth Ave., Miami, Fla. Roderick Martin Jr. is branch manager of the facility which will stock nonferrous and stainless steel fasteners.

General Materials Co., New Hyde Park, N. Y., a division of Crosby Products Corp., is constructing a 40,000 sq ft warehouse at Plainview, N. Y. Steel and metal specialties, including titanium items, will be stocked in the facility—it will triple the firm's present plant and also serve as the company's headquarters.

Atlas Steels Ltd., Welland, Ont., opened a service center at 3030 Walker Rd., Windsor, Ont. The building contains 15,760 sq ft of floor space and stocks 700,000 lb of specialty steels. James Sutherland is branch manager.

Interstate Steel Co. will formally open (on June 13) its $1.1 million office and steel service center at 401 Touhy Ave., Des Plaines, Ill.

Liquid Carbonic Div., General Dynamics Corp., Chicago, is constructing a liquid nitrogen, oxygen, and argon plant in Tewksbury, Mass. The facility is expected to go on stream Jan. 1, 1962. Charles W. Willwerth is district sales manager-industrial gases for the New England area.

Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for measurement and control, opened a $700,000, 40,000 sq ft assembly plant in East Bridgewater, Mass.

Motor Wheel Corp., Lansing, Mich., opened its 127,900 sq ft manufacturing and office facility in LaGrange, Ind. The plant turns out 40 products, including space heaters and air conditioners for the mobile home industry, residential space heaters, and riding, rotary lawn mowers.

Fred D. Wright Co. Inc. opened its tool and die plant at 707 Spence Lane, Nashville, Tenn. The 40,000 sq ft facility is equipped with a variety of metalworking tools, including duplicating mills, boring mills, and 200 ton tryout presses.

Spyraflo Inc., subsidiary of Penn Engineering & Mfg. Corp., Doylestown, Pa., has begun operation of its new plant in North Miami, Fla. The subsidiary will be devoted to research and development of mechanical parts and specialties for electrical and miniaturized electronic components, instrumentation, and guidance and control systems.

Lear-Romec Div., Elyria, Ohio, **Lear Inc.**, is constructing a $1 million commercial pump and motor manufacturing plant in Santa Monica, Calif. The 35,000 sq ft facility is scheduled to be in production by October.

NEW ADDRESSES

Rotor Tool Co. of Canada Ltd. established its main offices and service facilities at 14 Taber Rd., Rexdale, Ont.

Extremultus Inc. moved to a larger plant at 130 Coolidge Ave., Englewood, N. J.

Security Valve Co., a subsidiary of Menasco Mfg. Co., dedicated its 15,000 sq ft, $250,000 facility at South Pasadena, Calif.

(*Please turn to Page* 124)

Capacability means Readiness

When it comes to refractories, *readiness* is Basic. You won't have to be "on guard" against slow shipments when you rely on Basic. Steelmakers know its eight plant network stands ready to supply a complete line of granular and tar-bonded refractories at the flick of a finger.

Supporting the company's main plant at Maple Grove, Ohio are other facilities in Ohio, Indiana, New York and Nevada. With the largest resources in the granular basic refractory industry, Basic has an annual capacity of well over a million tons.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

problems

"Miniaturization makes power transmission extra-tough . . . but G.S. Precision Gearing specialists can give us a big head-start on our new designs."

"For years we've brought in G.S. Precision Gearing experts at beginning stages of design jobs—and it has paid off, whether in modifying existing products or breaking trail in radically new directions. Miniaturization has given us even tougher Precision Gearing problems—but G.S. is still saving us all kinds of grief by leading us to practical power transmission methods early in the game.

"G.S. makes the full range of Small and Intermediate Gearing: Spurs, Spiral, Bevels, Helicals, Internals, Zerols, Clusters, Ratchets, Splines, Hobbing, Worm Gearing. That means they're free to prescribe the *right* kind of Gearing—and then turn around and *produce* it right, run after run (as our production people will tell you).

"I guess it all boils down to this: We want top quality, so we deal with top sources—and G.S. is known all over the country (among both big and little companies) as *the* source of precision-made Small and Intermediate Gearing in production quantities—which, of course, means production economies. And there's one other thing that means a lot to all of us—their men are mighty nice guys to work with! I'd recommend that you put them on *your* design team when you come up against a Precision Gearing problem."

YOU'LL FIND G.S. GEARING IN TOP QUALITY PRODUCTS LIKE THESE . . .

Adding Machines • Aircraft Carburetors & Fuel Metering Systems • Aircraft Instruments and Radios • Automatic Musical Instruments • Automation Systems • Business Machines • Check Signing & Protecting Machines • Clippers for Barbers, Animal Shearing & Hedge Trimming • Cloth Cutting Machines • Coin Changers & Counters • Communication Equipment • Control Mechanisms • Electric Fans • Electric Motors • Floor Polishers, Sanders, Scrubbers, Sweepers • Food & Drink Mixers, Blenders • Home Appliances • Lawn Sprinklers • Machine Tools • Meat Tenderizers, Grinders, Slicers • Military Equipment • Motion Picture Cameras & Projectors • Optical Instruments • Outboard Motors • Pneumatic Production Tools • Radio & Radar Tuning Assemblies • Radio Anti-backlash Gears • Range Finders • Record Changers • Sewing Machines • Steel Strap Stretchers • Step Switches • Tapping, Drilling & Threading Equipment • Telephone Dials • Television Sets • Thermostatic Controls • Typewriters • Vending Machines • Washing Machines.

SEND FOR G.S. *illustrated folder! See where and how we mass-manufacture Small Gearing to uniformly fine tolerances. Folder contains 23 pictures of Small Gears, plant view, Diametral and Circular Pitch Tables. Ask for your copy on company stationery, please!*

45 Years of Specializing in Small Gearing!

FRACTIONAL HORSEPOWER GEARING

GEAR Specialties, Inc.

2635 WEST MEDILL AVENUE
CHICAGO 47, ILLINOIS

SPURS • SPIRALS • HELICALS • BEVELS • INTERNALS
WORM GEARING • RACKS • THREAD GRINDING

WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF FRACTIONAL HORSEPOWER GEARING

We call the metal parts shown here Ultra-Special because they are the result of completely new cold-forming and finishing techniques. They are typical examples of how users are reducing costs by taking advantage of the strength, improved quality, close dimensions and economy of mass-producing parts by cold-forming.

In the past, the limitations of the cold-forming process forced manufacturers to accept parts which were made by other, more costly methods. Now, through extensive research and development work Townsend is cold-forming Ultra-Special items with intricate shapes and critical dimensions held to tolerances as close as .001 inch. They may be made by combining cold-heading processes with impact extrusions, special heat-treatment and coatings, to name but one of the new techniques.

The use of Townsend Ultra-Special items in your product assembly could provide the means to make better products at lower costs. Investigate by asking a Townsend field engineer to call. Write Townsend Company, Engineered Fasteners Division, P. O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

In Canada: Parmenter-Bulloch Manufacturing Co., Limited, Gananoque, Ontario

(*Concluded from Page* 121)

Handy & Harman has moved its executive offices to 850 Third Ave., New York. The firm supplies brazing alloys and precious metals which are vital to fabricating operations in many industries.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., moved its York, Pa., sales office to 257 E. Market St. F. G. Brown is branch manager.

ASSOCIATIONS

American Supply & Machinery Manufacturers' Association Inc., Cleveland, elected these officers: President, Paul A. Johnson, Dake Corp., Grand Haven, Mich.; first vice president, G. H. Woodland, Chain Belt Co., Milwaukee; second vice president, D. L. Price, Norton Co., Worcester, Mass.; secretary, W. K. Downey, Skil Corp., Chicago; and treasurer, J. F. Reed, Manning, Maxwell & Moore Inc., Stratford, Conn.

National Industrial Distributors' Association, Philadelphia, elected these officers: President, J. D. Williams, Mau-Sherwood Supply Co., Cleveland; first vice president, W. L. Foss, M. L. Foss Inc., Denver; and second vice president, A. F. Riecken, Orr Iron Co., Evansville, Ind.

Southern Industrial Distributors' Association, Atlanta, elected these officers: President, R. K. Allison, Industrial & Textile Supply Co., Charlotte, N. C.; first vice president, T. M. Nelms, Wessendorff, Nelms & Co., Houston; and second vice president, G. R. McCalla, Industrial Supplies Inc., Memphis, Tenn.

Electronic Industries Association, Washington, elected these officers: President, L. B. Davis, Electronic Components Div., Owensboro, Ky., General Electric Co.; senior vice president, R. S. Bell, Packard Bell Electronics Corp., Los Angeles. Vice presidents are: G. W. Keown, Tung-Sol Electric Inc., Newark, N. J.; S. R. Curtis, General Dynamics/Electronics, Rochester, N. Y.; Ben Adler, Adler Electronics Inc.,

Problem:

One Straight Cut... *One Miter Cut*

Solution:

One MARVEL No. 8 Band Saw

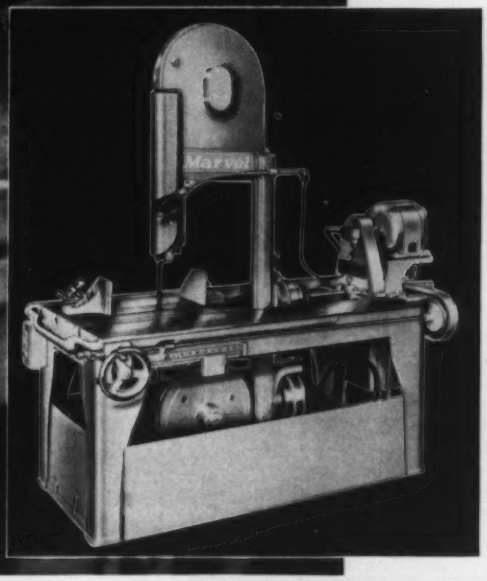
Recently, a MARVEL Field Engineer was called on to help solve a troublesome production sawing operation.

He found that a straight cut and a 45° miter cut were required on a 10" diameter pipe prior to welding it into an assembly. Production was slow, cutting costs were climbing to alarming proportions, and too many pieces were being rejected because one or both cuts were not meeting accuracy standards.

The trouble was easy to find. A makeshift arrangement was being used to do the job. After the straight cut was made, the miter was laid out and the pipe swung out into the aisle so that the saw could make the angle cut. Excessive work handling slowed production, valuable floor space was taken up, and accuracy became increasingly difficult to maintain.

Recommending a MARVEL No. 8 Universal Band Saw solved the problem. When the MARVEL Field Engineer showed how the Saw's column and blade can be tilted up to 45° right or left of vertical and fed straight into and through the cut at the pre-determined angle *while the work remained stationary on the table*, the production superintendent recognized the answer to his problem. He also saw, how the built-in protractor would eliminate all layout.

Result: another MARVEL No. 8 Universal Band Saw went to work for a new user.



Cutting miters quickly and accurately is just one of a hundred jobs that can be done on the versatile No. 8 Universal Band Saw ...the most useful—and used—metal cutting saw on the market. Get complete information on this time and cost saving band saw today. Write for Catalog 875.

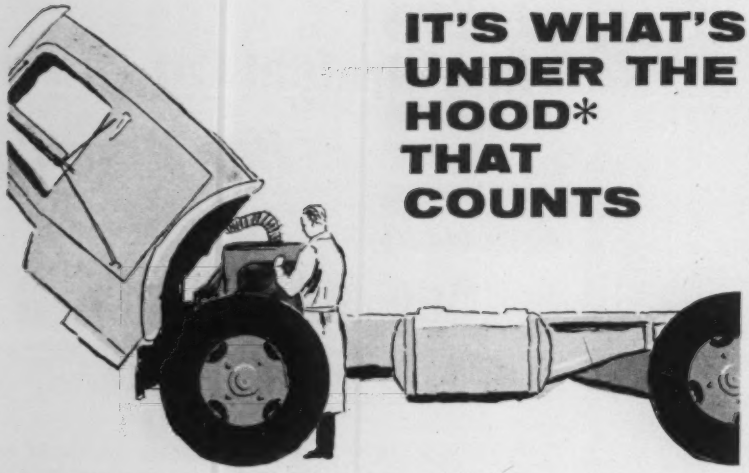
Marvel No. 8 Universal
Metal Cutting Band Saw
Capacity: 18" x 18"

MARVEL *Metal Cutting* **SAWS**

BETTER MACHINES
BETTER BLADES

ARMSTRONG-BLUM MANUFACTURING CO. • 5700 Bloomingdale Avenue • Chicago 39, Illinois

S-1319



IT'S WHAT'S UNDER THE HOOD* THAT COUNTS

Like the motor in your car or truck, what's under the hood of your **Kinnear Rolling Door** is as important a part of its extra value as the part that is always in view.

Concealed in the hood of each **Kinnear Rolling Door** is a mechanism so skillfully engineered and ruggedly built that it has no equal for long-lasting, low-cost efficiency.

In fact, the rugged precision of Kinnear's under-the-hood mechanism is one of the reasons it so seldom needs to be seen (just as you seldom look under the hood of a car with a trouble-free motor).

Although this sometimes makes the first cost of **Kinnear Rolling Doors** a little bit higher than "copies," *it also assures lowest-cost door operation and maintenance.*

Under-the-hood quality is also one of the reasons so many **Kinnear Rolling Doors** have served continuously — *often in daily use* — for more than half a century!

In addition, **Kinnear Rolling Doors** offer coiling upward action that clears the entire opening quickly . . . saves floor, wall and ceiling space . . . keeps the opened door curtain out of the reach of damage by wind or vehicles.

When fully closed, **Kinnear Rolling Doors** *provide extra protection* against wind, weather, vandalism, trespass—even against fire. (Heavy galvanizing** resists corrosion, and Kinnear Paint-Bond makes any finish coating you apply adhere immediately and last longer.)

Hot-dip galvanizing adds 1.25 ozs. **pure zinc to each sq. ft. of metal (ASTM standards).

The KINNEAR Mfg. Co.
FACTORIES:
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

KINNEAR ROLLING DOORS
Saving Ways in Doorways

New Rochelle, N. Y.; and W. S. Parsons, Centralab Div., Globe-Union Inc., Milwaukee. Leslie F. Muter, Muter Co., Chicago, was re-elected treasurer; James D. Secrest, executive vice president; and J. B. Olverson, general counsel.

American Gear Manufacturers Association, Washington, elected these officers: President, C. F. Bannan, Western Gear Corp., Lynwood, Calif.; treasurer, R. C. Ball Jr., Philadelphia Gear Corp., King of Prussia, Pa.; executive director, J. C. Sears; and vice presidents, J. Harper Jackson, Jackson Gear Co., Pittsburgh, and F. Richardz, Technical Div., Buffalo, Westinghouse Electric Corp.

Charles P. Weisz has been appointed structural engineer for the **Wire Reinforcement Institute,** Washington. Frank B. Brown is the managing director.

Purchasing Agents Association of Chicago elected these officers: President, R. B. Berry, deputy purchasing agent for the city of Chicago; first vice president, R. F. Sielisch, Radio Industries Inc., a subsidiary of Thompson Ramo Wooldridge Inc.; and second vice president, Glenn Reinier, Abbott Laboratories.

D. R. Longman of J. Walter Thompson Co., New York, was elected president of the **American Marketing Association,** Chicago, to serve for one year, beginning July 1, 1962.

NEW OFFICES

Silicone Products Dept., Waterford, N. Y., **General Electric Co.,** opened a sales office at 1229 Burlingame Ave., Burlingame, Calif. Red Baurmeister is the sales representative.

Burgmaster Corp., Gardena, Calif., established sales offices at 4908 Lincoln Ave., Chicago 5, Ill., and at 86 N. Maple Ave., Newark, N. J.

Leeds & Northrup Co., Philadelphia, opened a new branch office in Birmingham. Daniel J. McKiever is manager.

Tear it out for your files

If the J & L Grinding insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

Details about Jones & Lamson Thread & Form Grinders

Also . . . a New Line of Compact, Precision Machines

J&L®

Two ways you can *have new machinery* in your plant . . .
and *keep your capital* too!

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BUSINESS REPLY MAIL
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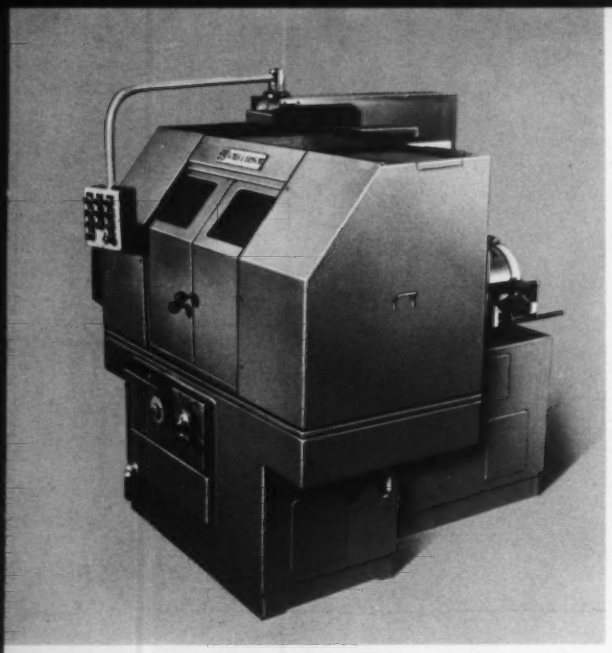
FIRST CLASS
PERMIT NO. 1
SPRINGFIELD, VERMONT

JONES & LAMSON MACHINE COMPANY
517 CLINTON STREET,
SPRINGFIELD, VERMONT, U. S. A.



MODEL E-2 AUTOMATIC FORM GRINDERS

The Jones & Lamson Model E-2 Automatic Form Grinder is specifically designed for precise, high production, plunge grinding on shaft work up to 31" in length. It is also adaptable for other types of between-centers work, as well as chucking work and jobs requiring external, shoe-type support.

These Important Features Provide PRECISION FORM GRINDING AT HIGH PRODUCTION RATES

COMPLETELY AUTOMATIC CYCLE . . . High-speed approach, variable wheel feed, spark out, and withdrawal are positively controlled through simple cam action. This ensures a constant and uniform machine cycle.

AUTOMATIC POSITIVE SIZE CONTROL . . . Wheel-slide held against positive stop with uniform hydraulic pressure.

AUTOMATIC TRUING DEVICE with CONTROLLED DRESSING . . . Once per piece, or once per predetermined number of pieces.

CRUSH WHEEL OR DIAMOND TRUING OR PERPETUAL FORM CONTROL (PFC — see center spread)

AUTOMATIC OR MANUAL HANDLING

COMPLETELY PACKAGED HEADSTOCK . . . Equipped with a constant speed A.C. motor. Work speeds range from 50 to 1500 R.P.M. Fast cycling (starting and stopping of the work spindle is done by means of an electric clutch and brake).

ADJUSTABLE WHEEL SPINDLE . . . Fast centerline adjustments for wheels varying from 3/8" to 2". Wheel flanges are also adjustable to accommodate wheel widths from 3/8" to 2".

DESIGNED FOR EASY MAINTENANCE . . . all hoods and guards are instantly removable. Internal machine components are readily accessible. For instance, the entire wheel-slide transmission can be taken out of the machine by simple removal of seven bolts.

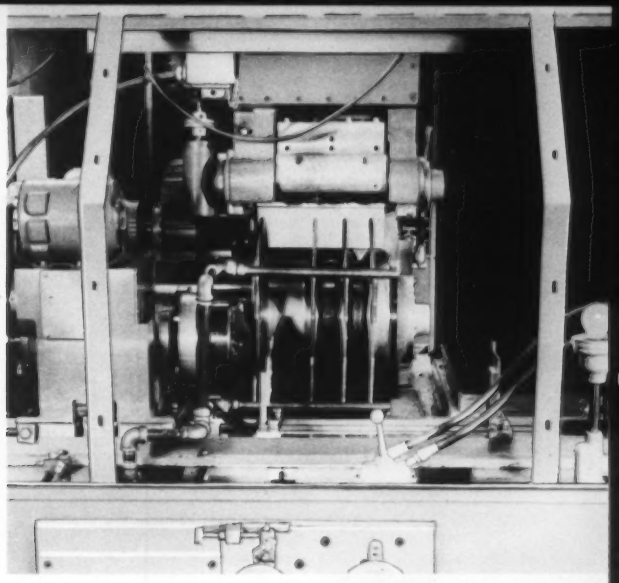
WHEEL-SLIDE HAS HARDENED AND GROUND WAYS . . . with three-point suspension system mounted on straight roller bearings.

EASY TO OPERATE . . . with features such as push-button control for automatic cycling, including automatic counter control for wheel truing.

All controls for operation and set up are located at the front of the machine. Free sliding doors to work area operate on roller bearings. There's plenty of room for loading and unloading—or for automatic handling.

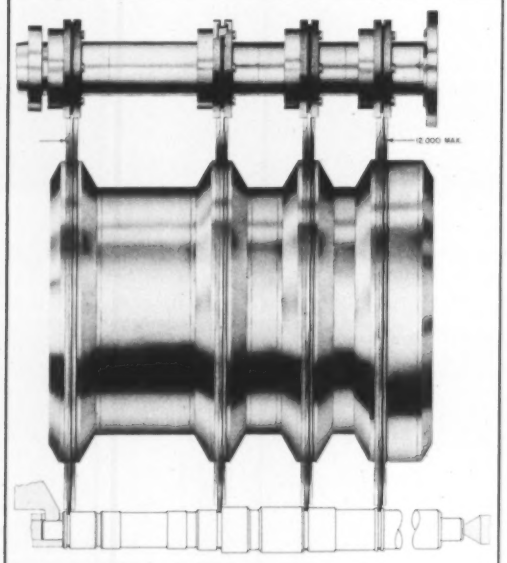
NEW

MODEL E-3 PROVIDES PERPETUAL FORM CONTROL FOR 12″ WHEEL SPREAD



This new Model E-3 Form Grinder is specifically designed for precise, high production plunge grinding of widely spaced grooves.

Vertical design of the J & L Perpetual Form Control Truing Device, allows for a full 12″ of wheel spread. Grooves up to 12″ apart may be plunge-ground in a single pass.



FORM — 4 GROOVES
TIME OUT FOR DRESSING — 0
PRODUCTION — 125 PCS. PER HOUR

SPECIFICATIONS

J & L Model E-2 & E-3 Form Grinders

	MODEL E-2	MODEL E-3
Max. dia. of work ground with 20″ dia. wheel	8″	8″
Headstock spindle-speed range	50-1500 R.P.M.	50-1500 R.P.M.
Max. dia. of swing over table	13″	13″
Max. length between centers	31″	31″
Platen — may be swiveled up to	15°	15°
Grinding wheel motor	5 to 25 H.P.	5 to 25 H.P.
Grinding wheel dia. 20″ and hole size	10″	10″
Hand infeed per graduation	.0001″ on dia.	.0001″ on dia.
Max. spread of multiple-spaced grinding wheels	5″	12″

If the J & L Grinding insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

J & L MODEL F AUTOMATIC THREAD GRINDING MACHINE

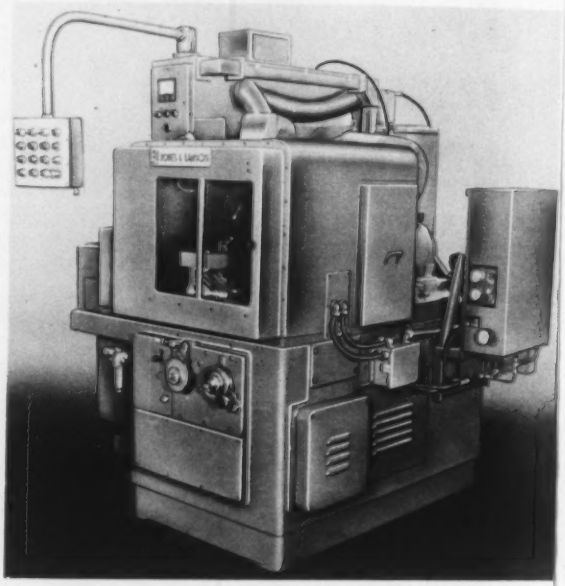
This machine is automatic in all of its functions. It will grind in both directions, or in one direction with automatic wheel withdrawal and rapid traverse. Pitch changes are accomplished through individual lead screws for each pitch, or hand of thread.

A wide range of work and wheel speeds are available. Work speeds range from 30 to 720 R.P.M. Rheostat control provides an infinite number of grinding wheel speeds between 1000 and 2600 R.P.M. This allows for quick selection of the most efficient speeds for all types of Vitrified and Resinoid Bonded grinding wheels.

Machine accuracy is guaranteed to grind threads within the following tolerances: pitch diameter to within .0005″ in regular production. Thread angle ±5′ on the half angle. Lead ±.0002″ per inch.

"CRISS-CROSS" GRINDING

Grinding time can be further reduced by 25%, when two-way grinding with two cuts. Here's how. Two wheel speeds and two work speeds can be provided automatically for each machining cycle. Work may be rough ground at a high wheel speed and a low work speed. Finish passes may then follow automatically with a lower wheel speed and at a work speed double that used for the roughing pass. This feature may also be applied when using one-way grinding.

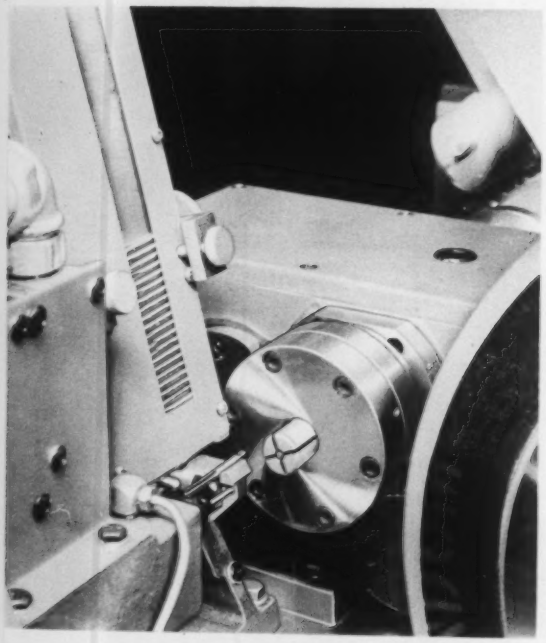


SPECIFICATIONS – Model F

Max. thread dia.	¼″
Max. work length	6.900″
Max. dia. swing over table	10″
Max. thread length	3″
Number of cuts**	1-2-3-4
Standard work speeds*	24 — min. 30 R.P.M., max. 720 R.P.M.

*On special applications, work speeds can be arranged to provide ranges as low as 8.6 to 136 R.P.M. These low speeds will accommodate work with diameters up to 1¼″

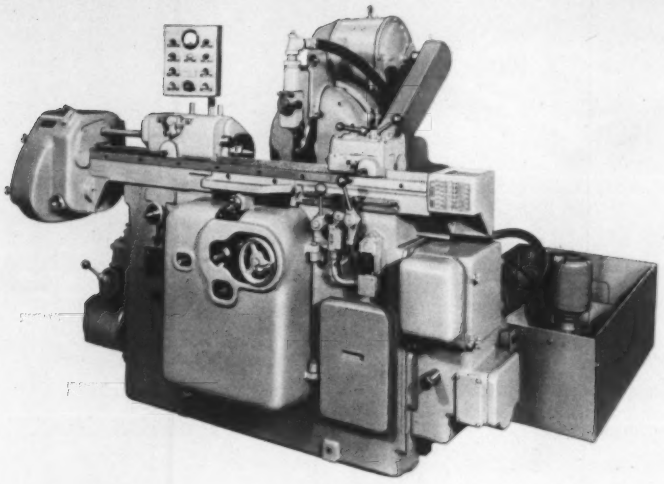
**6-8 on two-way grind.



AUTOMATIC HANDLING On MODEL F AUTOMATIC THREAD GRINDER

Here is automatic handling as applied to the Model F in a tap grinding operation. Magazines for seven different sizes of taps ranging from #6 to ⅜″ are applied to the machine. The tap blanks are then fed to the grinding position, ground, and unloaded — automatically. A warning light, or horn, tells the operator when to change the empty magazine for a full one.

Production of up to 120 pieces per hour is possible.



AUTOMATIC THREAD GRINDERS

6″x15″
6″x36″
12″x45″

6″ x 36″

MODEL TG-615. The 6″ x 15″ Automatic Thread Grinder is used for high-production thread grinding with multi-rib wheels, on relatively small, light work.

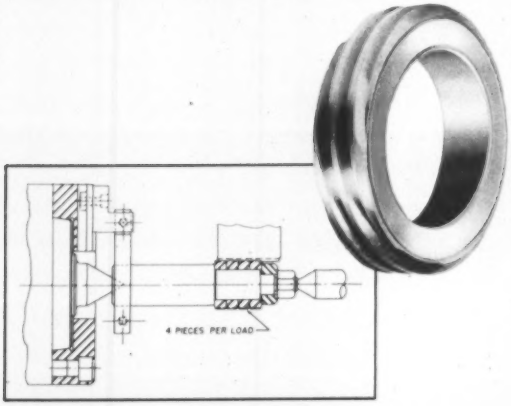
MODELS TG-636 and TG-1245. These machines are extremely versatile and are used on long or short-run jobs on taps, studs, gages, hobs, worms, spindles and a great variety of precision threaded parts. They are also used extensively for various kinds of form grinding. Single-rib, three-rib or multi-rib wheels can be used. They are fully automatic in the work cycle. Automatic dressing of the wheel, automatic sizing, automatic compensation for the amount dressed off the wheel, are some of the features that make these machines the finest of their kind for high precision thread grinding in the tool room or in the production line.

SPECIFICATIONS

	TG-615	TG-636		TG-1245	
	**	*	**	*	**
Max. thread dia.	6″	6½″	6½″	12″	12″
Max. thread length	2″	12″	2″	18″	2″
Max. work diameter	7½″	7½″	7½″	21″	21″
Max. work length	30″	36″	31″	45″	40″
Max. distance from end of thread to headstock center	14¾″	24″	19″	33″	28″

*Single-Rib Wheel.
**Full Multi-rib Wheel.

Any of these machines can be arranged for plunge grinding single or multiple grooves or contours. Multi-ribbed wheels, either diamond or crush dressed, are adaptable for all models.



SPEEDOMETER DRIVE GEARS

These four-start worms are ground, four at a time, in a single pass from the solid. A multi-ribbed wheel is crush-dressed every 48 pieces (twelve arbor loads). The finish on these parts and the rate of production exceed those possible by any other methods.

210 pieces per hour, floor-to-floor

SPECIFICATIONS

Diameter	1.93″
Pitch	Approx. 6
Form	Worm
Thread	4-Start
Lead	.6797″
Helix Angle	6° 37′
Thread Length	1⅛″
Stock removed	.089″

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Simultaneous Grinding a

This process is made possible by PFC (perpetual form control) truing devices manufactured by Jones & Lamson and CDP (cemented diamond particle cutters) produced by the Koebel Diamond Tool Company.

It provides continuous automatic control of accuracy for grinding wheels and grinding wheel action.

This revolutionary development permits you to grind many applications that otherwise would not be considered as economically sound for a grinding operation. It also allows one to materially improve upon a wide variety of operations performed by other machining methods or grinding approaches. For instance, automatic handling on grinding jobs becomes a much simpler and more economical process when there is no "time out — for wheel truing".

Depending upon the nature of the job, the wheel truing can be done, either intermittently, or continuously. The frequency of truing is controlled by an electric counter which is set to a predetermined number of pieces. This number is determined by the various specifications and complexities of the operations.

Even when using an intermittent truing cycle, the actual wheel truing occurs simultaneously with the grinding operation. Therefore, whether you are grinding and truing continuously or intermittently — no time is lost for conditioning the wheel.

Life of the CDP cutters is phenomenal. It frequently ranges over several months and hundreds of thousands of pieces ground — without changing the cutters. On one installation the original cutters are still in use after grinding over six million pieces. Also, the versatility of this process permits the best use of either Resinoid or Vitrified bond wheels.

Figures 1, 2 and 3 on the opposite page illustrate typical examples of groove grinding operations employing the PFC plunge form truing device with assemblies comprised of standard and special CDP cutters. Figure 4 shows a thread grinding operation using the PFC multiform truing device. In this case the cutter is controlled by a former as it is traversed across the wheel. Truing may occur simultaneously with the thread grinding operation providing more than one grinding pass is taken.

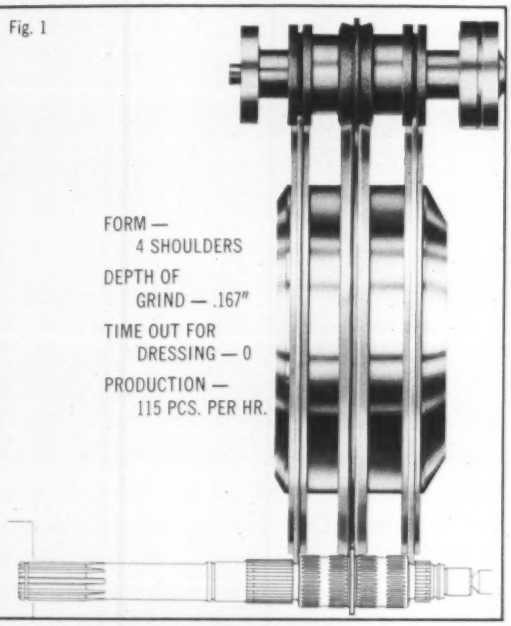
When equipped with the proper former, the PFC multi-form truing device may also be used for a wide variety of contours for form grinding applications. A single universal design cutter will accommodate a wide scope of threads and forms, or a specialized cutter may be provided for ultimate performance on long-run operations.

The multi-form technique is also adaptable for tolerance and finish requirements which are beyond the range of the plunge form method.

With any of the methods described, the amount trued off the wheel is automatically and accurately compensated for. Therefore, either manually operated or automated machines maintain part size to closer tolerances over a longer period of time than other methods where the dressing tool is more subject to wear. Due to negligible wear on the cutters over long operating periods, substantial savings are also made in inspection costs as only occasional spot checking is required.

and Wheel Dressing

Fig. 1



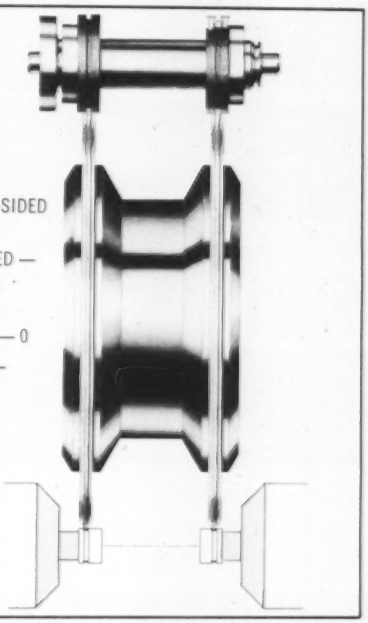
FORM —
4 SHOULDERS

DEPTH OF
GRIND — .167″

TIME OUT FOR
DRESSING — 0

PRODUCTION —
115 PCS. PER HR.

Fig. 2



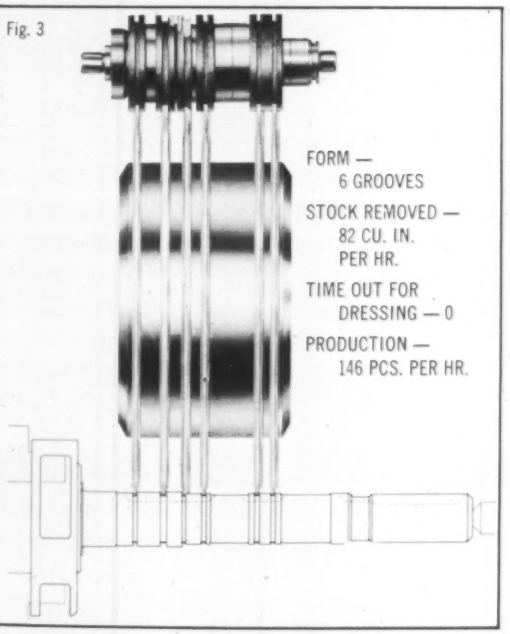
FORM —
STRAIGHT-SIDED
GROOVE

STOCK REMOVED —
.040″ ON R.

TIME OUT FOR
DRESSING — 0

PRODUCTION —
2,400 PCS.
PER HR.

Fig. 3



FORM —
6 GROOVES

STOCK REMOVED —
82 CU. IN.
PER HR.

TIME OUT FOR
DRESSING — 0

PRODUCTION —
146 PCS. PER HR.

Fig. 4

FORM — 60° THD.
8 T. P. I.

STOCK REMOVED —
.087″ ON R.

TIME OUT FOR
DRESSING —
.04 MIN.

PRODUCTION —
31+ PCS. PER HR.

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NEW

MODEL 410 SEMI-AUTOMATIC THREAD GRINDER

High Precision
Compact Size
Low Priced

SPECIFICATIONS

Max. dia. of work	4″
Max. thread length	10″
Max. swing over table	4¾″
Work spindle speeds	2.5 to 120 R.P.M.
Grinding wheel speeds	2700 R.P.M
Max. helix angle	15°
Pitches available with standard set of change gears:	5, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 24, 27, 28, 32, 36, 40, 44, 48, 56, 64, 72 and 80

The J & L Model 410 is the first completely new thread grinding machine to be developed in many years. Here is a compact size thread grinder, priced accordingly, that provides *full size* capacity and exceptional accuracy.

ACCURACY is within ±5′ on the half angle; size control. 0005″ on pitch diameter; lead error ±.0002″ per inch. Here is how it's done:

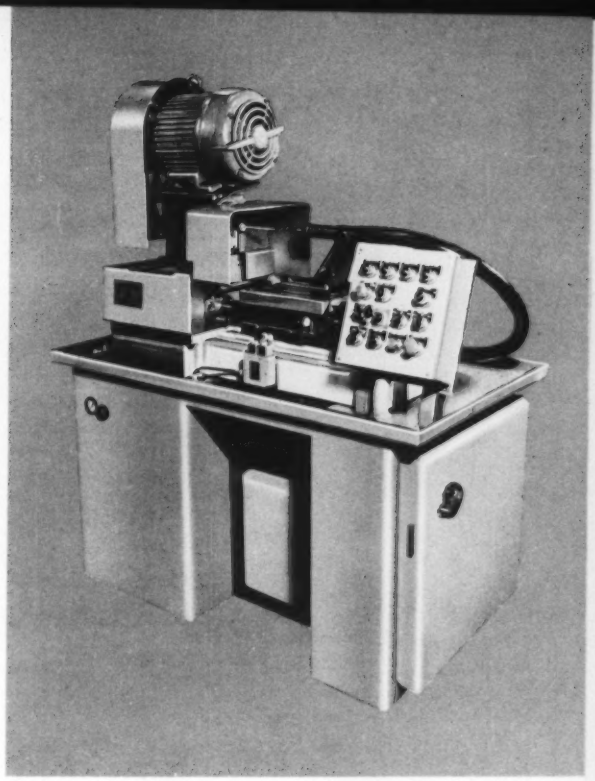
High precision is designed for all sliding units using pre-loaded roll design for smooth accurate movements. Lead screw and infeed screw are precision ground. Direct line design of feed screw and stop for accurate size control. Precision work and wheel spindles are cartridge type, pre-loaded and lubricated for life. An inbuilt sine bar provides for long or short lead. A simple, accurate truing device dresses straight sided flanks from 5° to 45° and included angles of 10° to 90°.

COMPACTNESS The 50″ x 54″ floor space includes the machine, electrical panel, coolant tank & pump, plus storage for wheels & tools.

LOW PRICED For approximately $2.00 per hour for a 40 hour week, this machine can be leased on a 5 year J & L Profitivity Lease Plan. Includes: capacity for up to 4″ dia. work with 10″ of full thread length; variable speed work spindle; change gears and lead screw for 5 to 80 pitch threads; automatic truing device; all electric equipment — complete with motor and control panels; dresser infeed attachment; belts and pulleys; tailstock and headstock with centers; wheel adapters and two grinding wheels; plus a set of diamonds and driving dogs. This same machine can be purchased outright for under $11,000.

NEW

PRECISION GUN DRILLING MACHINE FEATURES HIGH PRESSURE COOLANT DISTRIBUTION PLUS SPINDLE SPEEDS OF 15,500 RPM



Here for the first time is a machine which combines the major features necessary for successful gun drilling of very small holes. They are:

1. A *precision high speed spindle* capable of handling high pressure coolant flow.
2. *Accuracy* necessary to control size and straightness as well as excellent finish.
3. *Precise control* of constant, but *infinitely variable feed rates.*

The precision, pre-loaded ball bearing, cartridge-type spindle is specially designed to perform dual functions. It is arranged to handle standard shanks of all gun drills from ½″ dia. down to the smallest (.078″) at speeds up to 15,500 R.P.M. It is equipped with a rotary distributor for handling up to 12 gallons of coolant per minute and pressures up to 2,000 p.s.i. This combination of high speeds and coolant distribution at high pressure is a unique feature of the J & L Precision Gun Drilling Machine.

The machine bed is a rigid diamond-ribbed design, insulated from the base cabinet on a three-point mounting which dampens external vibrations.

The table is air-actuated with rapid traverse and feed controlled by a precision hydraulic check unit.

Performance will vary with material and conditions. However, when working with reasonable material, using proper gun drills in proper alignment, the machine is capable of producing parts to .0005″ in hole straightness up to 6″ in length. It will also hold diameter to .0002″ at a finish of 10 micro inches or better.

Penetration rates of 12″ per minute, or better, are not unusual.

SPECIFICATIONS

Max. length of hole	7½″
Stroke	7¼″ (max.)
Diameter of hole	max. ½″ — min. .078″
Variable or single speed drives for complete range of speeds	3500-15,500 R.P.M. 1750-7350 R.P.M. and 850-3675 R.P.M.
Feed rates	infinite
Floor space — without Coolant System	56″ x 34.5″
Floor Space — with Coolant System	56″ x 83.5″

If the J & L Grinding insert is missing, write JONES & LAMSON, 517 Clinton St., Springfield, Vermont, for your copy.

NEW MODEL 6 PRECISION BORING MACHINE

High precision . . . Compact size . . . Low priced

This extremely versatile new model is a highly accurate machine for precision boring, turning, and facing operations.

Accuracy is guaranteed to hold .0002" tolerances on boring and turning operations (these machines are holding tolerances of .00005" on some operations now being performed in the field).

Precision balance, rigidity, and infinite feed rates provide the basis for maintaining the best possible finish requirements.

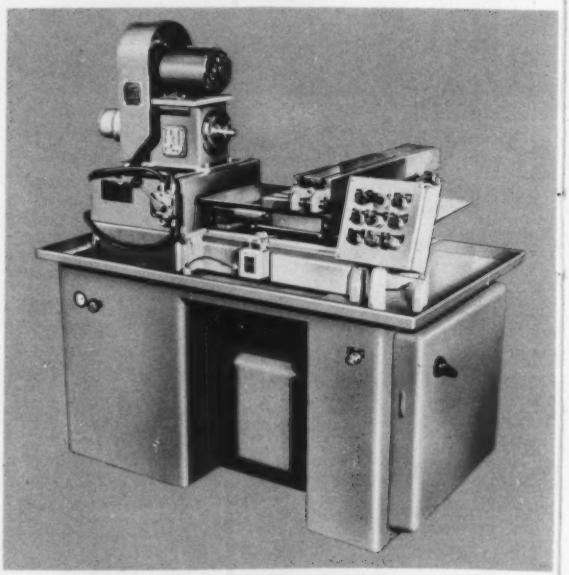
Various machine cycling combinations are available to the operator by merely setting a selector switch. These include: automatic table cycle, automatic table-and-cross-slide cycles, and completely manual operation.

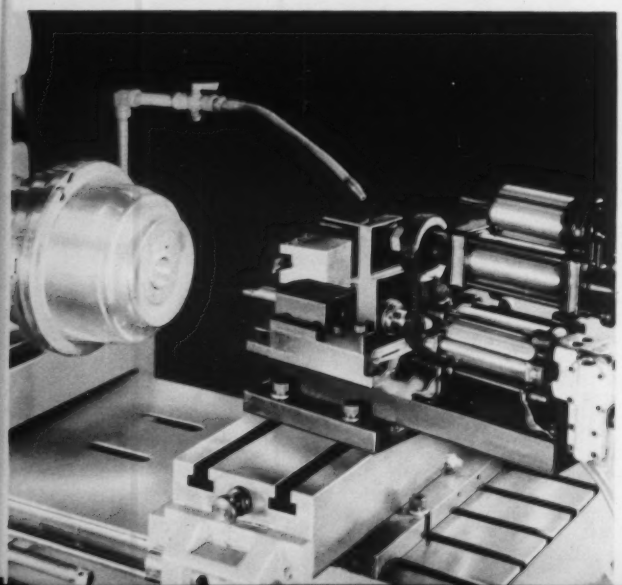
Set-ups are fast and simple All stops and feed adjustments are made from the front of the machine — without wrenches. Operation is even more simple. Just push one button.

Low priced For the wages of a part-time handy man, or about 95¢ an hour (figured at 160 working hours per month for 5 years) you can lease this precision machine with standard tooling arranged to handle most boring, turning and facing jobs with the capability of holding tolerances of .00005". That's profitable precision for less than $1.00 per hour. Outright purchases make the investment even more attractive.

SPECIFICATIONS

Swing	10" dia. (max.)
Stroke	7⅝" (max.)
Bore	3" dia. (max.)
Speed range	900-3280 R.P.M. or 1500-6000 R.P.M.
Floor space	56" x 34.5"





Machine V-Belt Groove and Bore Tapered Hole in one operation

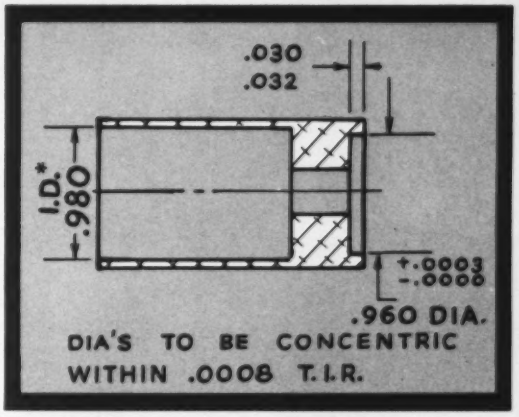
These pulley starter housings are gripped internally on an air operated chuck and located against a drive pin. The automatic cycle is as follows: the table moves to a stop position and the cross-slide feeds in to form a V-shaped groove. The cross-slide then backs out in rapid traverse and an auxiliary air hydraulic feed slide moves in to finish bore the hole on a taper. Feed rate for the grooving operation is .0005" at 480 R.P.M. The boring operation is to .005" at 480 R.P.M.

The Job:

Counterbore and hold concentricity on a high production part. Counterbore must be concentric with I.D. within .0008". (Material — aluminum alloy.)

The Solution:

Counterbore two pieces at once on double spindle machine. The table advances both tools to desired depth. The cross-slide then feeds toward the operator to face the bottom of both pieces. The work is held on the I.D.* with air operated collet arbors.

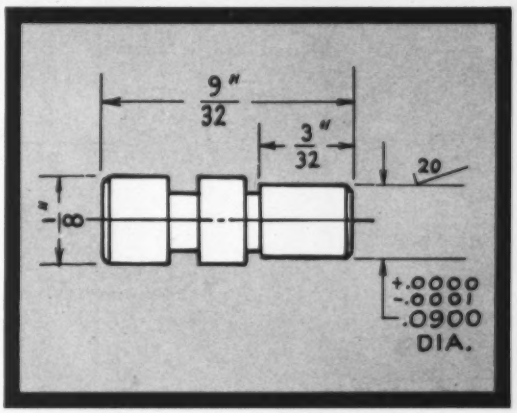


The Job:

Turn and chamfer parts too small for intended centerless grinding. (Material — Stainless SAE 30310.)

The Solution:

Hold in air-operated diaphragm chuck on 1/8" dia, Turn .090" dia. and cut chamfer at end of stroke. A single carbide tool was used on this high production job. The operator had only to load, push the automatic cycle button and unload.

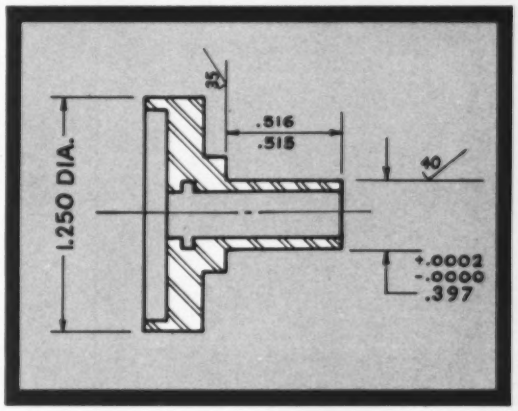


The Job:

Turn .397" dia., face end, and cut "O" ring groove. (Material — 303 stainless steel.)

The Solution:

Hold on 1.250" dia. in air operated chuck for turning and facing. Part is then reversed and held on .397" dia. for cutting "O" ring groove in second operation. Closed cycle feature assures fastest possible cycle as machine is in rapid motion except when cutting groove.



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TUNGSTEN DEVELOPMENTS—Fabrication experts at Battelle Memorial Institute, Columbus, Ohio, report these developments: Explosive compaction of tungsten powders to 95 per cent of theoretical density; explosive forming of oddly shaped tungsten nozzles in an aluminum bath at 1800° F—blanks are constructed of rolled and welded sheets.

BRAZING TUNGSTEN—Joints between tungsten and graphite are being brazed with a Mo-30Cr-20Ni alloy, W-50Ni, Nicrobraze, GE J-8100, and Coast Metal 62 alloys, Battelle Memorial Institute also reports.

ADVANCE POLLUTION CONTROL—Odors from six objectionable gases can be eliminated by an air filtration process developed by Mead Corp., Dayton, Ohio. (Previous efforts have been unsuccessful, says the firm.) The firm has developed two systems for reducing water pollution. One is a trickling filter medium. It is said to be more efficient than previous media and can be employed in other filtering applications.

SPOTS HAFNIUM, ZIRCONIUM—An analytical technique developed by the National Bureau of Standards, Washington, enables chemists to separate in a single step hafnium and zirconium in solutions. The elements are ordinarily extremely difficult to distinguish chemically.

LAMINATING UPS PERFORMANCE—A sheet laminated from two or more thin sections of any material performs better at some temperatures than a single sheet of equal thickness, claims Watertown (N. Y.) Arsenal Laboratory. The practice lowers the temperature range over which fully ductile fracture may be obtained.

IMPROVED INSULATOR—A wet blanket ½-in. thick (Thermosorb) placed between the inner and outer walls of a spacecraft can keep an astronaut tolerably comfortable when outside temperatures reach 4000° F, says Chance Vought Corp., Dallas. The approach is expected to lead to industrial applications.

HOT TIP FOR HOT DIP—Magnesium in amounts between 0.04 and 0.05 per cent by weight in a galvanizing bath improves corrosion resistance 20 to 90 per cent in industrial-marine atmospheres, claims Dow Chemical Co., Midland, Mich. (See Page 154.)

TAKE A FAST SPIN—Centrifuges can now be made that will spin a tiny rotor at 1.5 million cps. Such progress has already provided a variety of instruments for scientific and technical applications: Molecular sedimentation, high speed photography, tests of the bursting strength of thin metal films, and purification of isotopes.

BETTER ENAMELED WIRE—Superior quality of product and sharply reduced operating costs are advantages claimed for high production wire enameling equipment made by GE's Industrial Heating Dept., Shelbyville, Ind. First installation is at GE's Ft. Wayne, Ind., plant.

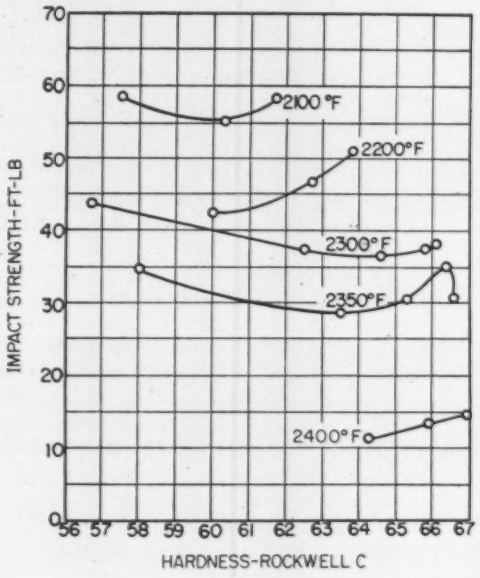
EXTRUSION HEAT CALCULATED—Under a given set of conditions, how much does an extrusion heat up during the extruding process? An English group has obtained the data needed to make precise calculations by experimenting with lead, tin, and aluminum. Data are backed up with practical observations.

PLASTIC SHIELDS REACTOR—The *N. S. Savannah* employs 12½ tons of polyethylene plates as a neutron shield. It does the same job as concrete but weighs much less, says Westinghouse Electric Corp., Pittsburgh.

PRESSURE JOINS BERYLLIUM—Pressure welding without a filler metal is one of the most promising techniques for joining beryllium, states E. M. Passmore, Avco Corp., Wilmington, Mass. He achieved joint efficiencies of 100 per cent with a weld deformation less than 0.5 per cent. Details are contained in PB 161,831, Department of Commerce, Washington 25, D. C. ($2.75). (Also, see STEEL, May 1, p. 56.)

How to Get More Process Variables

"High speed steels are again gaining prominence as tooling materials for the difficult jobs. Two reasons: Industry is increasing its use of materials that are difficult to work and require toughness in the tools used. Also, a family of recent developments has extended the application range of high speed steels. Now, careful grade selection and proper processing can make high speed steels pay off as never before," says Dr. George A. Roberts.



By DR. GEORGE A. ROBERTS and DR. JOHN C. HAMAKER JR.
Vice President-Technology *Director, Research & Metallurgical Engineering*
Vanadium-Alloys Steel Co.
Latrobe, Pa.

FOUR ACHIEVEMENTS in high speed steels are obsoleting some of the commonly used handbook data on machinability.

The reason: Much of the tool life and machining information on high speed steels was derived from tests on 18-4-1 tool steel, a versatile material but one that's without some of the high properties available today.

The four developments that can have a significant effect on tooling applications:

1. Super-high-speed steels (high carbon, high vanadium) fill the gap between conventional high speed steels (ideal for jobs like interrupted cutting or high rake angle machining of hard materials) and the carbides and ceramics.

2. Free machining grades make it easier to manufacture tools and also give a better surface finish to some cutters.

3. The 68 to 70 Rockwell C grades facilitate cutting hard, heat treated materials.

4. Special surface treatments reduce friction and improve tool performance.

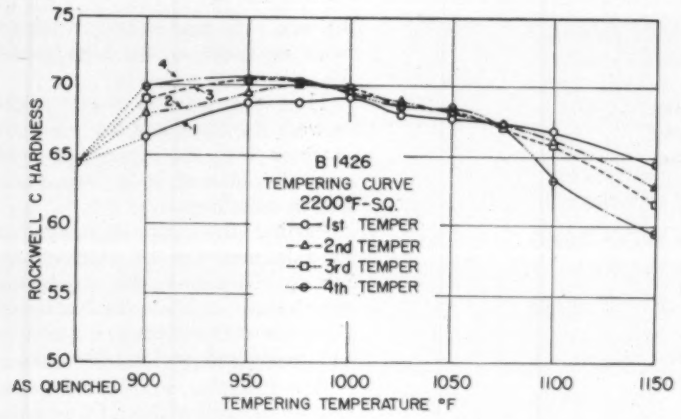
Super-High-Speed Steels

Three properties have the most influence on cutting tool materials performance: Wear resistance, hot hardness, and toughness.

Highest wear resistance and hot hardness are obtained with the super-high-speed steels. Intermediate values are obtained with the transition group (steels with a composition between that for supergrades and that for the conventional grades). Relative toughness, on the other hand, follows the reverse trend.

This relationship holds true for all cutting tool materials. Moving along the broad spectrum from high speed steels to cast alloys, cemented carbides, and ceramics results in increasing wear resistance and hot

from High Speed Steels



New, superhard, B-1426, high speed steel shows progressive hardness increase with successive tempering, to over 70 Rc at 950 to 1000° F. Over 63 Rc is retained to tempering temperature of 1100° F, indicative of good resistance to overheating in cutting. Material is austenitized at 2200° F for 2½ minutes, salt quenched at 1050° F, and air cooled

High speed steel toughness can be improved by decreasing the hardening temperature while simultaneously adjusting the tempering temperature for the desired working hardness. Here's how "underhardening" works on T1: As shown, the impact strength at 63 to 64 Rc is increased from 30 to about 50 ft-lb by reducing the hardening temperature from 2350 to 2200° F

hardness with a corresponding reduction in toughness.

Wear resistance tests (based on grindability) by Dr. Leo Tarasov, Norton Co., Worcester, Mass., indicate that the super-high-speed steels have 4 to 10 times as much resistance to grinding as the conventional grades. Abrasion tests by Armour Research Foundation, Chicago, indicate similar ratios. Cemented carbides and ceramics reflect still greater abrasion resistance.

Hot hardness is also significantly superior in the high carbon, high vanadium steels. All the high speed steels show a significant hardness advantage over the annealed machinery steel at these temperatures. It is particularly noteworthy, however, that the T15, super-high-speed steel gives consistently higher hot hardness than the T6 material originally developed for red hardness requirements.

Tests have shown that the vanadium carbides in these materials are harder than any of the other particles tested, including the tungsten carbide in cemented carbide tool bits and the aluminum oxide in grinding wheels. The vanadium carbide particles were about 9 Rockwell C harder than the iron-tungsten-molybdenum carbides found in conventional high speed steels.

In the heat treated state, ready for operation, the proportion of vanadium carbide to total carbide in the conventional steels is generally less than 20 per cent, while it is well over 50 per cent in the super-high-speed grades. Also, there's a marked increase in the proportion of vanadium carbide in the hardened versus the annealed condition of the super-high-speed steel. This indicates: This carbide is also extremely stable, resisting solution in the matrix during the heat treating operation and thereby contributing to grain refinement for maximum toughness. Incidentally, this principle of adding carbide particles to tool steels by proper proportions of vanadium and carbon in the composition has been successfully applied to other tool steels of the cold work, hot work, and low alloy variety to provide extra wear resistance and toughness.

Toughness is achieved by a combination of high yield or fracture strength and high ductility. The standard impact test measures the shock resisting component of toughness, but it fails to reveal much about strength or ductility separately. Accordingly, most tool materials are evaluated for toughness by bending a specimen as a simple beam and measuring the amount of deflection, yield strength, and breaking stress or modulus of rupture.

When steels with a lower alloy content than is found in high speed steels are undertempered to get greater hardness, the strength properties decrease considerably below an optimum. The tremendous strength potential of high speed steel is being employed to an ever greater extent in dies, tools, and structural

Hardness, Strength

Pictures for Tool Materials

	ROCKWELL HARDNESS "15N" Scale 15 kg	STRENGTH (Modulus of Rupture) 1000 psi
High Speed Steel . . .	92	600-650
Super-High-Speed Steel	94	550-650
Cemented Carbide . .	95-97	100-350
Ceramic	94	80-100

parts not normally requiring cutting properties or heat resistance. The alloy combinations occurring in high speed steel also appear to offer the most potential for future aircraft, missile, and other structural materials requiring strength levels above those presently available.

Due to their inherently fine grain size, the super-high-speed steels are tougher than you would expect from their relatively high carbon content. Over most of the hardness range, the super-M4 is second in impact strength only to M2 and surpasses that of both the conventional steels M10 and T1. T15 lies in about the same range as the lower cobalt T4 and T5 grades and is about twice as tough as the high cobalt T6.

Thus the marked improvement in wear resistance and hot hardness obtained with the super-high-speed steels is obtained with little sacrifice in toughness.

Further dramatic improvements in toughness can be obtained by merely decreasing the hardening temperature while simultaneously adjusting the tempering temperature for the desired working hardness.

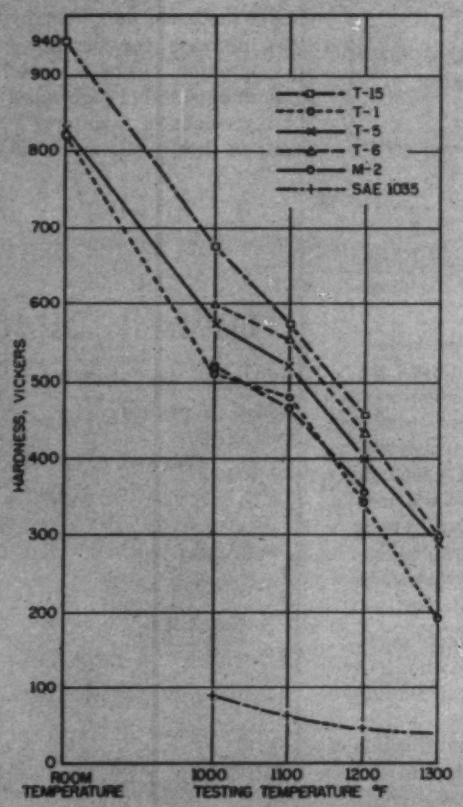
For example, on T1 steel, this impact strength at 63 to 64 Rc is increased from 30 to about 50 ft-lb by reducing the hardening temperature from 2350 to 2200° F. This technique, called underhardening, is excellent for punches and dies for cold working operations. Performance records frequently show a multiplication of service life compared with that obtained from the most wear resistant cold work die materials.

Tool Steel Properties

The authors have rated 11 selected high speed steels for wear resistance, hot hardness, and toughness—the three most important properties for cutting tool performance

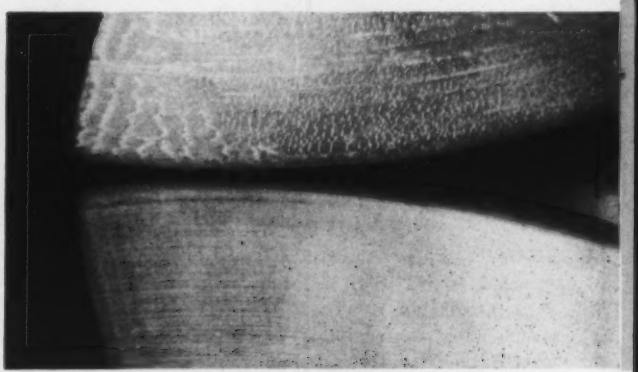
Numerical Evaluation	Resistance to Wear	Hot Hardness	Toughness
Highest 1 to 2	T15; M15 M4	T15; M15 T6; T5	M2; T1 M1
Medium 3 to 4	M3; T6 T5; M2	M4; T4 M3	M3; M4 M10
Lowest 5 to 6	T1; M10 T4; M1	T1; M2 M10; M1	T4; T5 T15; M15 T6

Plot of hot hardness shows how tool steels compare with annealed machinery steel (SAE 1035). Also, T15, super-high-speed steel beats 20 per cent cobalt T6, originally developed for red hardness



Ultrahard HSS

Aircraft, missile, and other indus-



This close-up shows the surface finish on two gear hobbing cutters. At top, regular HSS provided a 60 microinch finish. Below, a free machining grade gave a 25 microinch finish. Also, the free machining grade tool cost substantially less

tries are faced with a growing problem of machining superstrength materials in the hard, fully heat treated condition. These steels, heat treated to hardnesses of 50 to 56 Rc have sometimes indicated the need for a harder cutting tool (in the vicinity of 70 Rc), which still retains sufficient toughness and edge strength to permit positive rake angles.

Careful balancing of alloying elements and carbon content, together with cobalt additions, will produce high speed steels capable of heat treatment to 70 Rc. B-1426 is a steel of this type that's being field tested on all types of cutting operations. Its tempering curve shows a progressive increase in hardness with successive tempering to over 70 Rc at 950 to 1000° F. Over 63 Rc is retained to a tempering temperature of 1100° F, indicative of good resistance to overheating in cutting. Derived from M1 high speed steel, B-1426 grinds about like standard high speed steel and exhibits exceptional impact properties for its hardness level.

Based on preliminary reports, it looks as though 70 Rc high speed steel will be used mostly to cut heat treated steels above 50 Rc. For other severe cutting operations, involving abrasion, work hardening of the workpiece, or heavy heat generation in cutting, the high vanadium super-high-speed steels still appear to provide the best answer among wrought tool materials.

Surface Treatments

You can often improve the performance of high speed steel cutting tools by giving them a final surface treatment. Liquid nitriding, oxidation, chromium plating, sulfidizing, and superfinishing are done after all hardening and tempering operations have been completed. With those treatments, the full cutting hardness of the parent steel is retained.

Some toolmakers are including both liquid nitriding and oxidation treatments as final steps in the manufacture of their tools. Chromium plating, used on gages and other wear parts both as an initial wear surface and for building up worn tools, has also demonstrated life improvements in some cutting tools. Sulfidizing is a relatively new process in which sulfur is impregnated into the steel surface from a cyanide salt bath, with definite improvements reported in resistance to seizing and tool life.

Government sponsored investigations on the ground finish of cutting tools demonstrated that superfinishes of 3 microinches or finer could result in tool life improvements of 10 times over those obtained with hand ground tools. This importance of the finish on cutting edges is universally recognized and should be carefully controlled in tool grinding operations.

Carburizing is incorporated with

Surface Treatment of HSS Tools

LIQUID NITRIDING OR CYANIDING

30 minutes at 1025° F for 0.001 in. case. Reduced friction and wear, high hardness.

CARBURIZING

Charcoal pack, ½ to 3 hours at 1650° F, 30 minutes at 1950° F, cool, multiple temper. 65 Rc in 0.025 in. case, 60 to 62 Rc in tough core.

OXIDATION

1050° F in steam or 285° F in special salt. 0.0002 in. layer reduces friction and wear.

CHROMIUM PLATING

0.0001 to 0.0003 in. layer reduces friction and wear.

SULFIDIZING

Sulfur impregnation from 2 to 4 hours at 1050° F in special salt reduces friction.

SUPERFINISHING

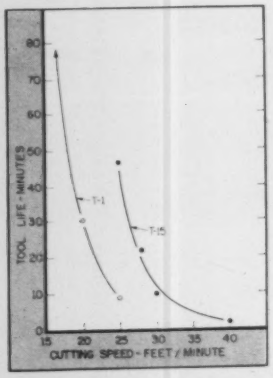
3 microinch finish can increase tool life ten times over hand ground.

Plusses of Free Machining Grades

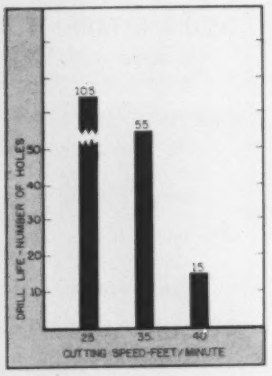
TYPE	GRINDING RATIO REGULAR	FM	IMPROVEMENT
DRY GRINDING			
M2	17	34	100%
M3 Type 1	5.5	15.4	180%
M4	2.8	9.5	240%
WET GRINDING			
M2	6.4	9.6	50%
M3 Type 1	2.7	4.2	60%
M4	0.9	2.1	130%

This table shows a 50 to 240 per cent improvement in grindability of several high speed steels due to free machining additions. M3 Type 1 and M4 are usually inherently difficult to grind because of their high wear resistance. The tests were made by Dr. Leo Tarasov, Norton Co.

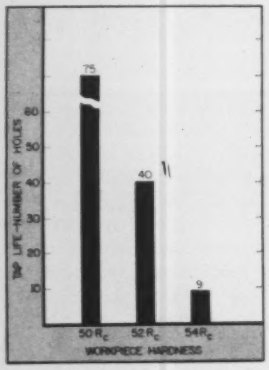
HSS Performance Reports



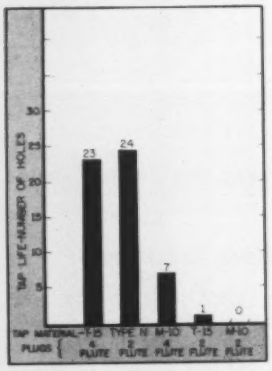
HS-25 solution treated (207 Bhn) steel is turned 20 per cent faster with a T15 tool than with T1. Tools were fed at 0.009 in. a revolution. Depth of cut was 0.062 in.



This shows the importance of using the right cutting speed. Drilling 410 stainless steel, a T15, HSS drill completed one hundred fifty ¼ in. holes at 25 ft a minute, only 15 holes at 40 ft a minute. Feed: 0.0005 in.



A nitrided surface on an M10, HSS tap performed well in tapping 5/16 in. holes in VascoJet 1000 (50 to 54 Rc). At both 50 and 52 Rc, the tests were discontinued with the tap still in cutting condition



Proper selection of tap design and material is important. T15, four flute tap was three times as good on this job (5/16-18 holes in VascoJet 1000) as a similar M4 tap. The work material here was 50 Rc

Source: Interim reports, U. S. Air Force machinability study.

the hardening of the tool. It produces extremely high carbon contents (2.60 to 3.00 per cent) on the surface with about 0.025 in. depth of case. It's used mostly for punches and dies on which a hard, wear resistant surface and a soft, relatively tough core are advantageous. The low heat treating temperature of 1950° F for carburized high speed steel results in a tough, underhardened core at 60 to 62 Rc supporting a hard abrasion resisting case at 64 to 65 Rc.

The carburizing technique is successful in the treatment of both conventional and super-high-speed steels.

Free Machining Grades

Added machinability on some high speed steel grades offers the user a chance to cut the cost of producing intricate HSS tools. Further, the surface finish produced on the tools may be superior when free machining grades are used.

Norton's Dr. Tarasov indicates that the grindability of free machining grades may be 50 to 250 per cent better than corresponding conventional materials. Most encouraging are the marked improvements in the super-high-speed steel M4 and the transition M3 Type 1 which are inherently more difficult to grind because of their wear resistance.

Property and tool performance tests on free machining grades (generally with 0.10 to 0.20 per cent sulfur) have indicated that most of the properties of importance to tool performance have not been too adversely affected by the resulting inclusions. The reason for this is believed to be the close association of the sulfide particles with the carbides already in the steel, so that additional discontinuities are not introduced in the matrix above and beyond those already present.

Tool Performance

Three recent machinability reports for the Air Force illustrate the advantage of super-high-speed steels and surface treatments to various machining operations.

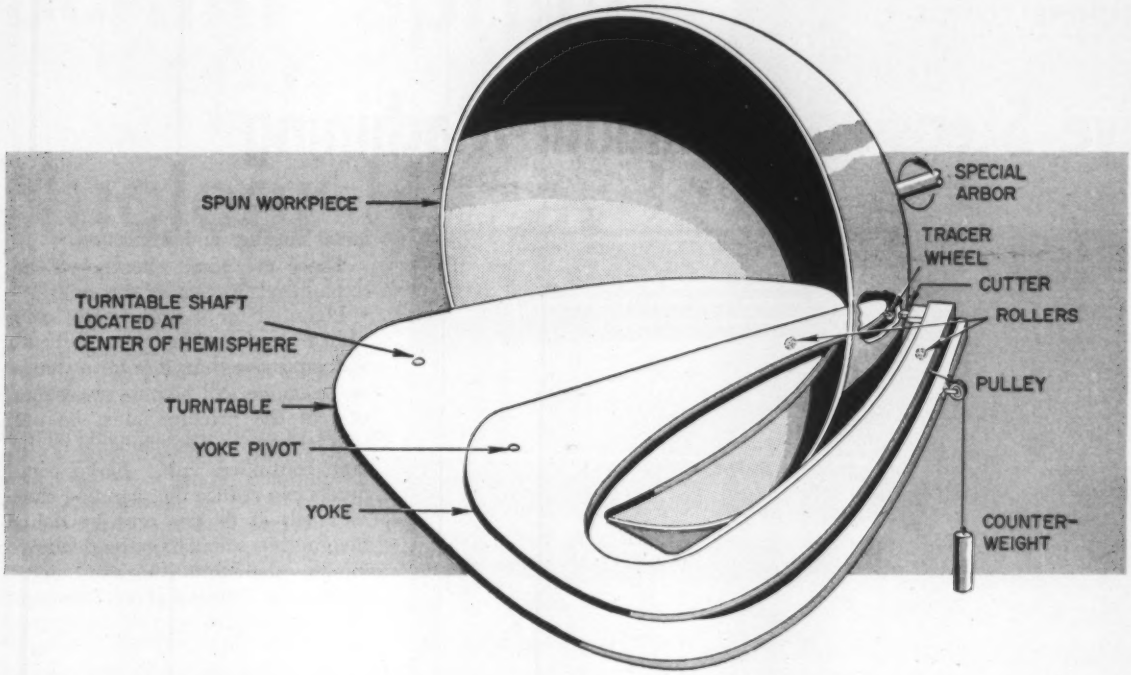
Here are some examples:

- T15 tools can turn HS-25 (cobalt base superalloy) about 20 per cent faster than T1 tools can. Tool life is equal.
- T15 also has about a 20 per cent advantage over T1 when face milling low alloy steels heat treated to 350 Brinell.
- T15 tool steel holds its own against cast alloy tools in face milling A286 superalloy.
- T15 steel beats the M7 grade at end milling AISI 410 stainless quenched and tempered to 45 Rc.
- At a variety of drill speeds, T15 drills give double the life of M2 when working on A286 heat treated to 321 Brinell.

A number of performance reports indicate that high speed steels are competing favorably with carbide on difficult to machine materials. Usually, it is a story of better tool life at somewhat reduced metal removal rates.

In one of the series of tests, for example, T15 steel gave 2 to 4 times as much metal removal as carbide when planing VascoJet 1000 at both 350 and 400 Brinell. The production rate for the T15 was lower (0.75 vs. about 2.50 cu in. in a minute), but in some cases, this would be offset by the advantages of greater life and lower cost.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*



Yokes traces shape when . . .

Lockheed Wheezey-Gheezey Sizes Missile Shells

• AN UNUSUAL turning device (called a wheezey-gheezey) easily shaves ¼ in. missile hemisphere shells into 0.020 in. skins accurate to 0.003 in. in aluminum and 0.0015 in. in steel.

The method reduces 5 ft nose cones more efficiently than chemical milling, says Fred C. English, production design engineer, Missiles Div., Lockheed Aircraft Corp., Burbank, Calif. The first machine did so well the firm now has four in production.

The machine is made from a converted Giddings & Lewis horizontal boring mill stripped of its table to gain additional swing. A special arbor is turned and bolted to each hemisphere then chucked in the boring mill.

• Raw material is a spun hemisphere—inside contour is less than 1/16 in. wavy, runout is ¼ in. (total indicator reading). The cutter is freewheeling.

The turntable is a 2 in. aluminum plate with a slot to clear the hemisphere (kind of a wraparound effect). Power is supplied to the table through a heavy duty shaft from a variable drive transmission.

An aluminum yoke is mounted offcenter, with pivot and rollers on the turntable. It can move independently yet be driven by the turntable.

A tracer wheel is mounted on one end of the yoke—a toolholder is directly opposite on the other side of the shell surface. A dead weight acting through a pulley holds the tracer wheel against the workpiece (it works better than a spring).

Early trials showed the machine was so accurate it faithfully transferred every surface imperfection on the inside to the outside shell surface. Inside surfaces of shells are hand finished to a 150 microinch smoothness before being mounted in the wheezey-gheezey.

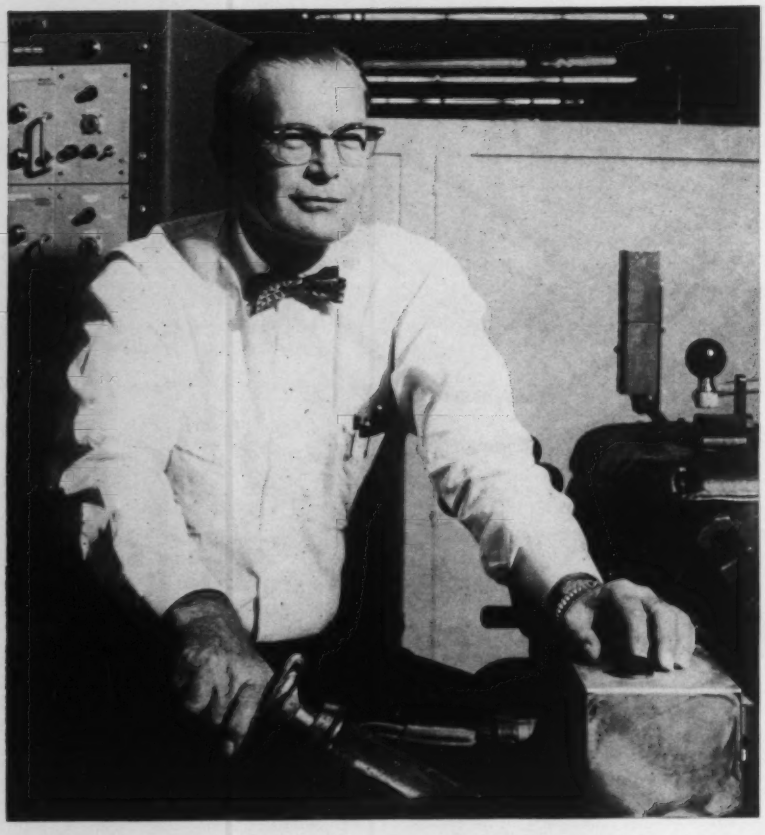
• Cams provide a means for varying the shell thickness.

A curved bar is attached by a pivot to the shaft bearing case of the boring mill. The bar is supported on the yoke by a fixed roller. The toolholder is modified to slide in a direction normal to the part surface and spring loaded to bear against the cam. Thickness of the part varies inversely with cam thickness.

Cams are also employed for cutting odd shapes like ellipses or a cylinder. On such shapes, cutter and tracer are frequently not perpendicular to each other, so the distance between the two varies. A cam compensates the variation to produce uniformly accurate wall thicknesses.

One nose cone made at Lockheed has bosses all the way around. By mounting a circular cam on the shaft concentric with the part and employing two hydraulic cylinders —one as a follower, the other operating against the spring holder—the bosses can be cut without difficulty.

Five Steps to Optimum Machining



"Machining methods that have not been changed in the last three years are not operating to full productivity," says GE's W. W. Gilbert

• IMPROVEMENTS in machine tools, controls, and cutting tools are coming fast. Changes must constantly be made in the production plant to realize optimum production rates, says Dr. W. W. Gilbert, manager, machining development service, General Electric Co., Schenectady, N. Y.

He believes that machining improvements can't be left to chance. A formal program is a must. Such a program requires you to:

1. Make an annual survey of your machining with an estimate of the potential improvements and savings.
2. Work on the most important projects first.
3. Pick the projects that offer the biggest savings in the shortest time.
4. Assign personnel with authority to act and give them a budget with goals and expected savings.
5. Measure the resulting savings and inform management of the improvements.

• For example, here's how to step up the productivity of a numerically controlled machine tool.

Measure the production costs of typical jobs, and you can learn the areas of greatest possible gains. The areas, says Dr. Gilbert, are planning, setup, machine operation, metal cutting, and inspection.

These are some checkpoints he recommends in each of the areas:

• Planning for a numerically controlled machine is more difficult and expensive than it is for a standard machine tool because every motion of the machine must be put into language understandable to the tape controlled unit. Large computers can reduce the planning time as much as 80 per cent by doing the routine calculations and allowing the planner to direct the major operations. Machinability computers can determine the maximum feeds and minimum cost cutting speeds compatible with the power available, surface finish desired, and the economic tool life. Tool life computers give the life and speed for minimum part cost.

• An expensive machine tool should not be used as a setup bench. Fixtures should locate and clamp the machined work. Low production parts should be preset on pallets outside the machine. Cutting tools should be preset and of a quick change type. Use automatic tool changers when possible.

• To reduce machine handling time to a minimum, make numerical program controls handle the feed, speed, and all auxiliary functions as well as the machine positioning.

• Cutting tools should take advantage of new materials when possible. Also, disposable inserts that can be preset have made it possible to double the machine speed and increase output. Use multiple tools where practical: For example, the combination d r i l l, ream, and counterbore will replace three separate tools and will reduce machining time by two-thirds.

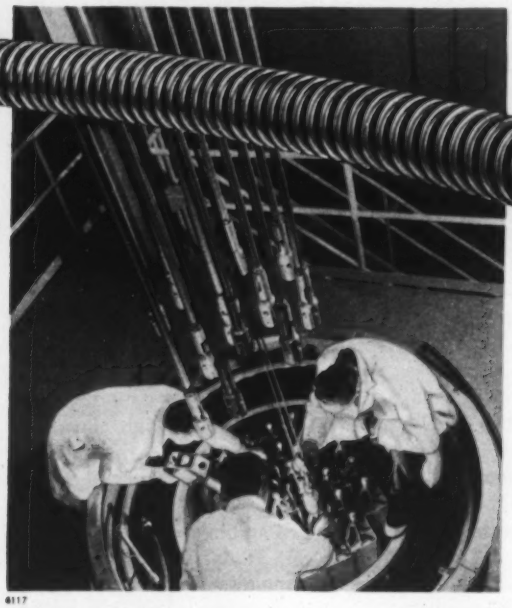
• Inspection equipment should be available at each stage of manufacture to detect and correct any errors. In-process gages should be sensitive enough to detect variations a tenth of the specified tolerance and should be used to control the tool setting or tool replacement.

"Scram" Springs Halt Nuclear Hazards

Whether installed in a ship for propulsion, or on land for electric-power generation, a nuclear reactor running wild is highly dangerous. In case of malfunction or overload, neutron-absorbing rods must be driven fast into the nuclear pile to halt fission.

For emergency scramming or driving the rods, the mechanical system utilizing coil springs offers a high degree of safety, reliability, and performance. The springs are under constant load while the reactor is operating, and stability under load is mandatory. They must retain their strength at high stress levels and show minimum load loss at temperatures beyond even 500°F. The material must be highly corrosion resistant and relatively unaffected by radiation.

Meeting exacting precision and performance requirements is no novelty for A.S.C. springmakers. From nuclear applications to automobiles and home appliances, A.S.C. Divisions offer engineering, mechanical and metallurgical resources unequalled in the spring industry. If such broad experience can be of benefit in your present or future developments, call in an A.S.C. Division.



6117

"Scram" springs act in emergency conditions to drive neutron-absorbing rods into the nuclear pile to halt fission.

Tight specifications and controls govern the "scram" spring from wire to finished product. During each stage of manufacture, tolerances are carefully checked by precision instruments.

Associated Spring Corporation

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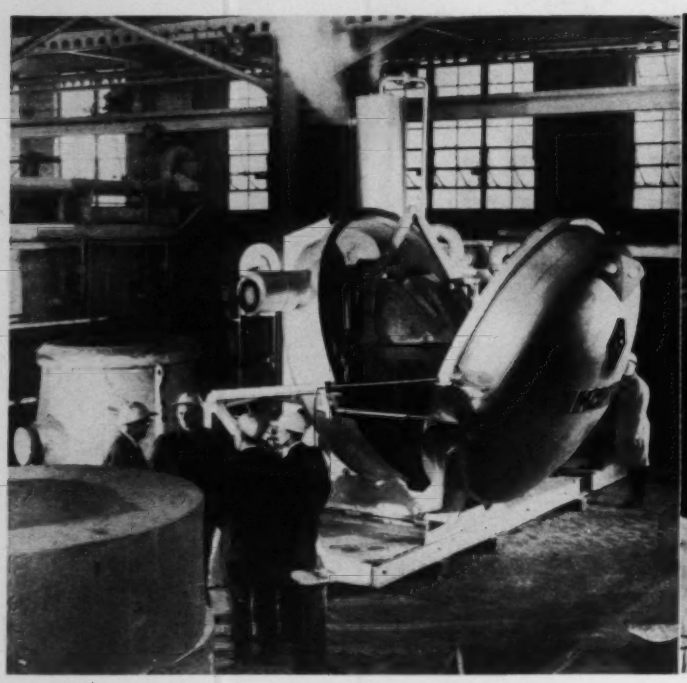

Designed for foundries, but applicable in ingot shops . . .

Small Degasser Promises Wider Use for Castings

• THE USE OF steel castings in critical applications may get a boost from small tonnage degassing systems, like the one developed by two Chicago firms—A. Finkl & Sons Co., and John Mohr & Sons Co.

The clamshell chamber unit, which handles steel in 5000 lb batches, was described at the Castings Congress of the American Foundrymen's Society, San Francisco, by H. S. Philbrick Jr., chief project engineer in the Mohr Vacuum Process Div.

• Portable equipment can be taken into small foundries for on-the-job evaluation of the degassing process.

The chamber, evacuating system, and control panel are mounted on a common base. That makes it possible to load the system on a truck with an overhead crane, transport it to the customer's melt shop, and set it up for operation in one day. Minimum services are needed — sources of steam, water, air, and electric power, and a modest supply of bottled nitrogen.

The degassing unit is operated by the customer for a minimum of two months, to determine feasibility of vacuum processing in his melt shop —and to decide what size unit is needed. The Finkl-Mohr system can be scaled up to handle 10 to 15 ton heats.

Previously, steel founders have had little choice of degassing systems, says Mr. Philbrick. Prohibitive capital costs prevented use of large degassers, and inadequate pumping capacity, heating apparatus, or refractories made smaller systems impractical.

• Wrought steel producers—particularly those making tool and specialty grades—are interested in the process.

The unit is arousing interest in ingot shops. It is being used by a tool steel producer to evaluate the effects of degassing; next, it will go to a shop that turns out stainless and specialty steels.

In September, the degassing system will be set up in a foundry that makes stainless and high alloy steel castings.

• The process pulls about half the hydrogen and oxygen from the molten steel. It doesn't remove appreciable amounts of nitrogen.

Steel founders aren't so excited about reduced hydrogen flaking and shorter thermal cycles—made possible by degassing—as the producers of large steel forgings are. But they stand to gain more from improvements in transverse properties, grain

(*Please turn to Page* 153)

BACK-UP ROLL SLEEVES AND ARBORS

by MESTA

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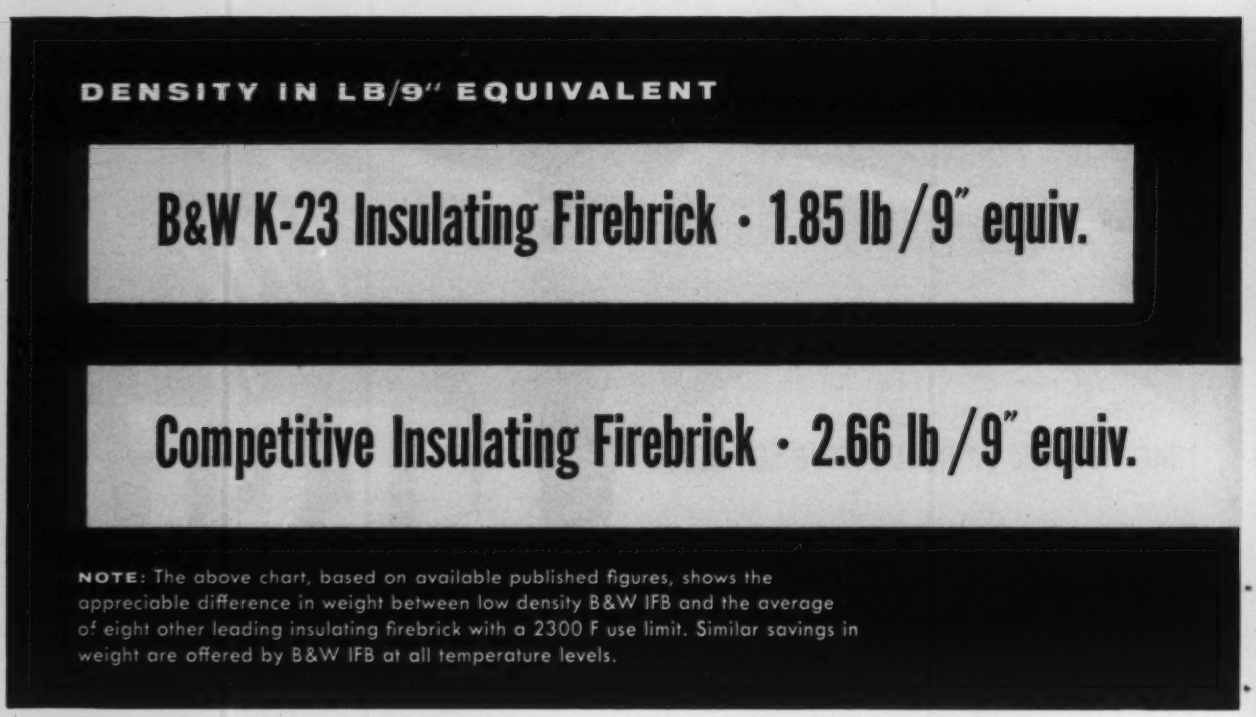
DENSITY IN LB/9" EQUIVALENT
B&W K-23 Insulating Firebrick · 1.85 lb/9" equiv.
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NOTE: The above chart, based on available published figures, shows the appreciable difference in weight between low density B&W IFB and the average of eight other leading insulating firebrick with a 2300 F use limit. Similar savings in weight are offered by B&W IFB at all temperature levels.

All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of IFB.

Take density. This important property, related to the porosity and the light weight of the brick, affects furnace weight, construction costs, fuel costs, and temperature control. Densities range from a B&W Insulating Firebrick low of 1.85 to a high of 2.80 per 9 inch brick for a competitive Insulating Firebrick—*approximately a 35% difference in dead weight and insulating efficiency.*

You are paying for *insulating* firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, N. Y.

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LESS FURNACE WEIGHT

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9 TONS LESS WEIGHT to heat and lift in this hood-type, 8 stack annealing furnace. Lined with B&W IFB at 1.85 lb per 9" straight, the refractory lining of this furnace weighs 37,000 lb as compared to 55,200 lb for *average weight competitive IFB*. 33% less weight to heat and lift when you specify B&W IFB. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

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SPEED CLAMPS® go on fast, trim weight and parts handling

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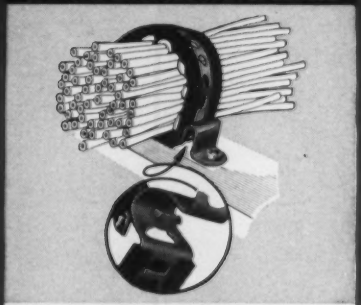
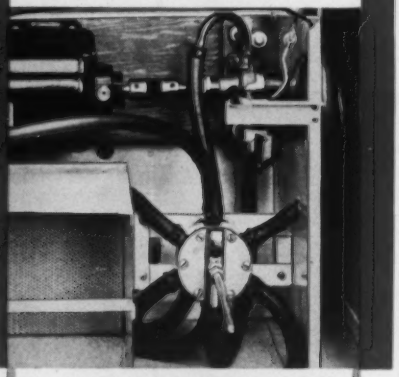
The complete line of Tinnerman SPEED CLAMPS includes hose clamps, tube clamps, harness clamps, and an assortment of special types to meet various requirements.

When buying clamps or spring-steel fasteners, look for the T-mark...your assurance that you're putting Tinnerman quality and total reliability into your products. For samples, literature, prices call your local Tinnerman Sales Office . . . listed in the "Yellow Pages" under "Fasteners." Or write to: *Tinnerman Products, Inc., Department 12, Box 6688, Cleveland 1, Ohio.*

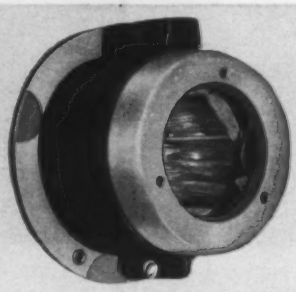
T-MARK ENGINEERED SPECIALS



TIME SAVING was the benefit when this Tinnerman Harness Clamp was used to fasten wire bundles to an aircraft structure. Inset shows safe, interlocking tongue and slot that can't spring open accidentally, yet opens readily for servicing without removing clamp from bulkhead.



ASSEMBLY SIMPLIFICATION resulted from a switch to Tinnerman Hose Clamps in this oil changer. One-piece SPEED CLAMPS are easy to apply, quickly secured with standard pliers. Savings in time and labor are substantial, excessive weight and parts handling are eliminated.



GREATER RELIABILITY is attained by television manufacturers with Tinnerman Deflection Yoke Clamps. They eliminate the problem of misalignment and broken connections resulting from rough handling, cushion the tube assembly under live spring tension.

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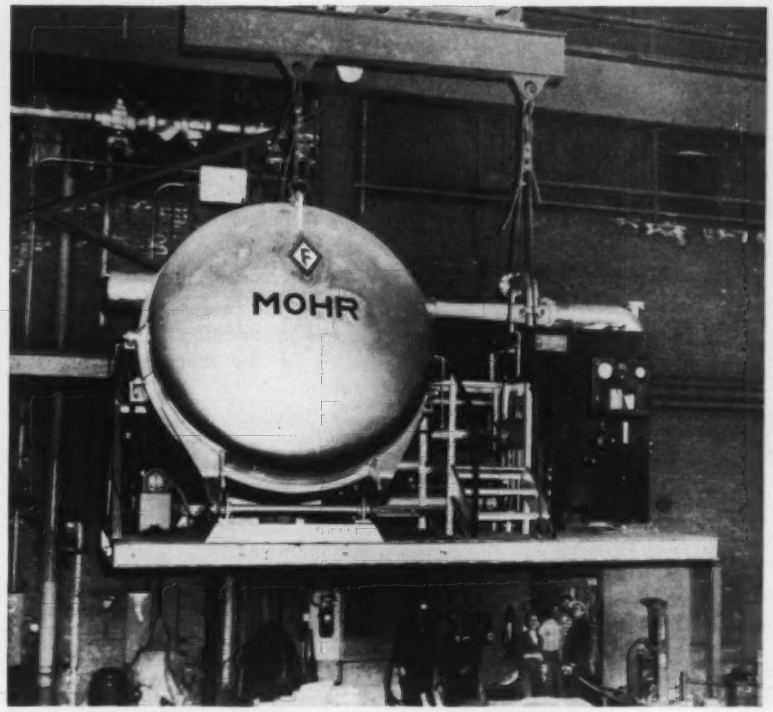

Portable unit permits in-plant evaluation

(*Concluded from Page* 148)

structure, density, fluidity, and cleanliness. And they're interested in minimizing porosity and surface defects—if a commercially practical process is available.

The Finkl-Mohr degasser reduced hydrogen content 54 per cent, and cut oxygen content in half (average) on seven test heats of silicon killed, high carbon steels at Finkl & Sons. Nitrogen removal was negligible. The 5000 lb batches were taken from 30 to 35 ton heats; when the small amount was processed, the remainders of the heats were tapped and degassed in a production setup.

Metallurgical results of the two processes showed close correlation, except that the production unit provided a 30 per cent reduction in nitrogen content.

One test was made on unkilled steel that contained 0.07 per cent carbon. Hydrogen content was cut 62 per cent; oxygen content was dropped 57 per cent; and nitrogen content was reduced 27 per cent.

• Degassing time could be held below 10 minutes under optimum shop conditions.

Temperature losses—a major problem in handling small heats—are minimized by a rapid handling and degassing sequence. The degassing system employs steam ejection pumping, with a dead end pressure of less than 50 microns. Distances between the melting furnace, degassing unit, and molds are kept at a minimum. The degasser is placed parallel to the crane bridge so the ladle can be moved rapidly.

The degassing ladle has a conical hood and cover, to reduce heat loss, contain splashing metal, and protect the degassing chamber from radiant heat. The cycle: Steel is tapped, and the ladle cover is closed and sealed with a castable refractory. Then the ladle is lowered into the open clamshell chamber. The chamber is closed, sealed, and evacuated—pressure is 500 to 700 microns at the end of a 4 to 5 minute cycle. After the valve between the chamber and the steam jets is closed, the chamber is pressurized with nitrogen to about half an atmosphere, then vented to the outside air and opened. Total time from tap to teem during degassing of test heats at Finkl & Sons: 14 to 20 minutes. More efficient handling and practice with the process are expected to reduce that time.

Capacability means Reliability

When it comes to refractories, *reliability* is Basic. You won't have to "walk a tightrope" during peak or emergency periods; steelmakers know they can depend on Basic. Its 40-year record of uninterrupted shipments is unique in the refractory industry and a valuable plus when reliability counts.

Served by two leading railroads, Basic's Maple Grove, Ohio plant ships around-the-clock — getting steelmaking refractories where they're needed . . . fast. To support rail transportation, extensive truck facilities are available for short hauls and emergency shipments.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

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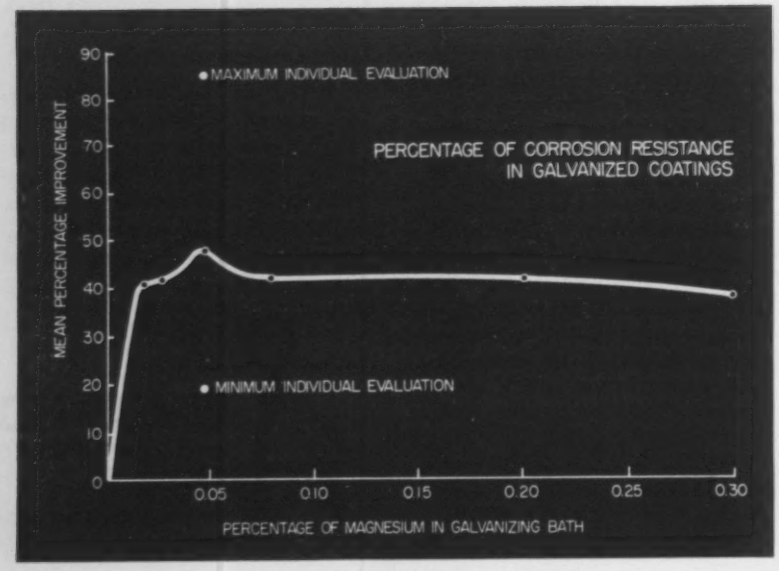
Stirring magnesium into a zinc bath. The . . .

Alloy Improves Service Of Galvanized Products



• SMALL additions of magnesium to zinc baths for galvanizing improve the corrosion resistance of the product, reports Dow Chemical Co., Midland, Mich.

Other characteristics of the process are outlined by John A. Heath of Dow's Texas Div.:

- Appearance of the coating is improved.
- Mechanical properties are not harmed.
- The addition and replenishment of the magnesium are not difficult.
- The added complications for the galvanizing process are within practical handling limits.
- Some parts of the process—such as drainage and icicle formation—are improved.
- The increase in cost is not high.

Tests have been carried on for six years. They show varying amounts of improvement in corrosion resistance, ranging from a low of 20 to a high of 90 per cent.

• The magnesium is used in baths containing aluminum.

Dow reports that the combination of aluminum and magnesium gives smoother, more attractive coatings than either does alone. The best range, says Mr. Heath, is 0.03 to 0.05 per cent magnesium, with one-tenth that amount of aluminum.

• The accompanying chart shows the improvement in corrosion resistance with varying levels of magnesium in the zinc.

Points making up the curve are based on several evaluations. The best range, the curve indicates, is the small peak in the line between 0.04 and 0.05 per cent magnesium. Here the improvement averaged around 50 per cent.

The exposure tests on which the reported results were based were run in relatively "aggressive" environments, Dow reports. Even so, the tests ran six years.

• Large scale work showed that the process can be used under usual galvanizing conditions.

To test the effect of the magnesium additions on pot life, a 10,000 lb capacity kettle was constructed. Examination of the service life of this kettle after two burnouts

diamonds . . . gold . . . carbide

He is watching the first . . . add a touch of the second . . . to the third

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showed no difference with or without the magnesium in the zinc.

• The magnesium may be added as the metal, or as an alloy.

Adding magnesium metal to the galvanizing kettle requires special procedures. Magnesium melts around 1200° F, well above the temperature of the molten zinc. So it must be made to dissolve in the zinc. It is pickled clean (Dow states that abrasive methods won't do), rinsed in water, dried, and floated on the surface of the bath.

As the magnesium floats on the zinc, an alloy is formed of about equal parts of each. The alloy is molten at the bath temperature. But if additional zinc is absorbed, the alloy resolidifies with about 80 per cent zinc and is difficult to dissolve. So the alloy is stirred with a flux paddle as it is formed. Then the high zinc alloy forms in small crystals which will go into solution more rapidly.

The simplest means of adding the magnesium is by use of an alloy. Eagle-Picher Co., Cincinnati, is offering an alloy containing 3 per cent of magnesium. It is used with regular prime Western slab zinc in the smelter pot.

• Operators can tell whether the magnesium level is right by the way the bath handles.

Says Mr. Heath: "When the magnesium content is low, the work just doesn't seem to drain as well as when it is right. And when the magnesium content is too high, the flux starts to get gummy, and oxidation increases noticeably."

• Commercial production of work using the magnesium-doped zinc is being started.

The first commercial product, Dow reports, is chain link fence. It will be marketed by Anchor Fence Div., Anchor Post Products Inc., Baltimore. The price is expected to be the same as that of the standard galvanized product.

The fence is being coated by the Nowery J. Smith Co., Houston. The Smith hot dip galvanizing facilities are reported to be among the largest in the Southwest, and the company is said to be the first to use the Dow development commercially.

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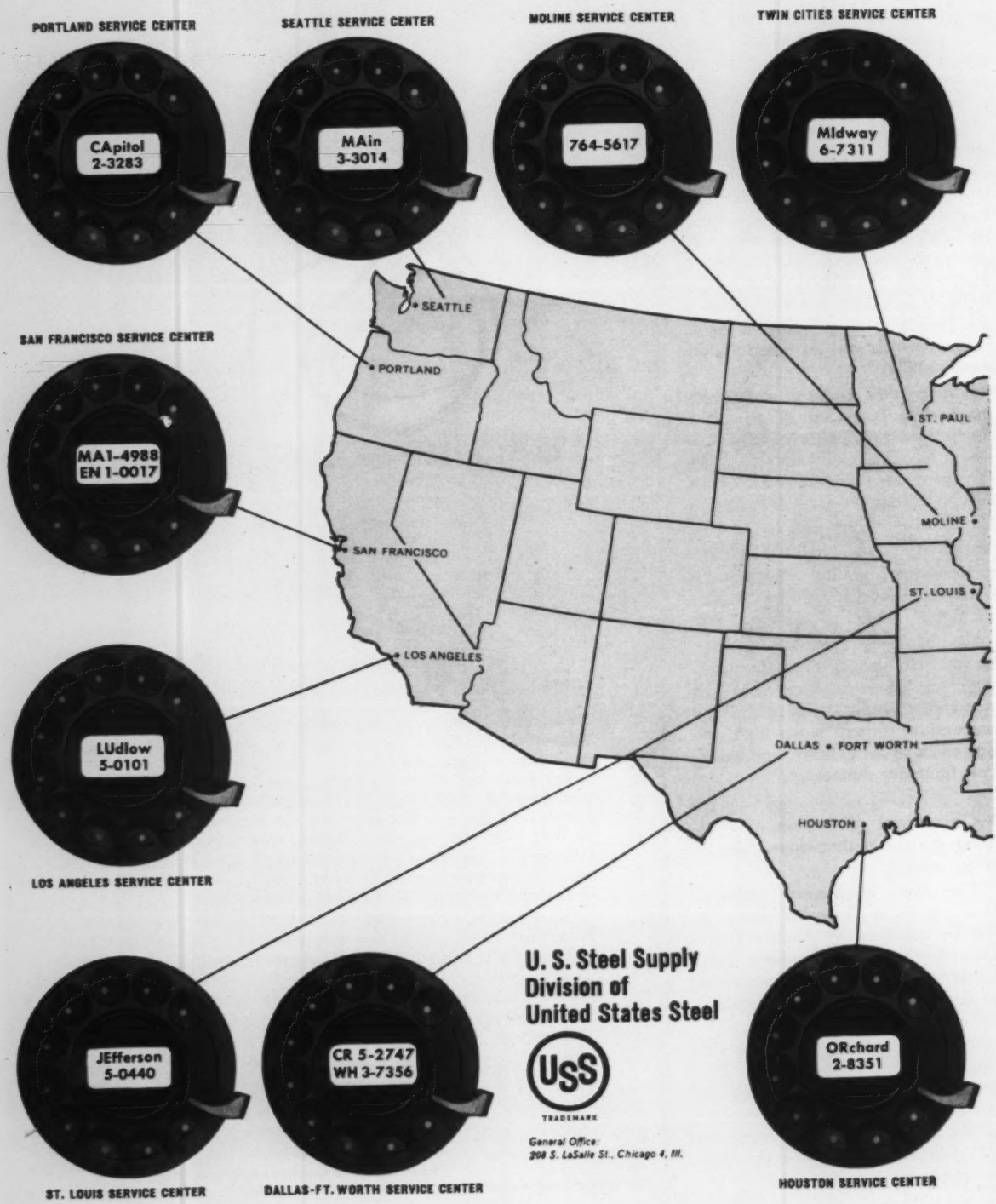

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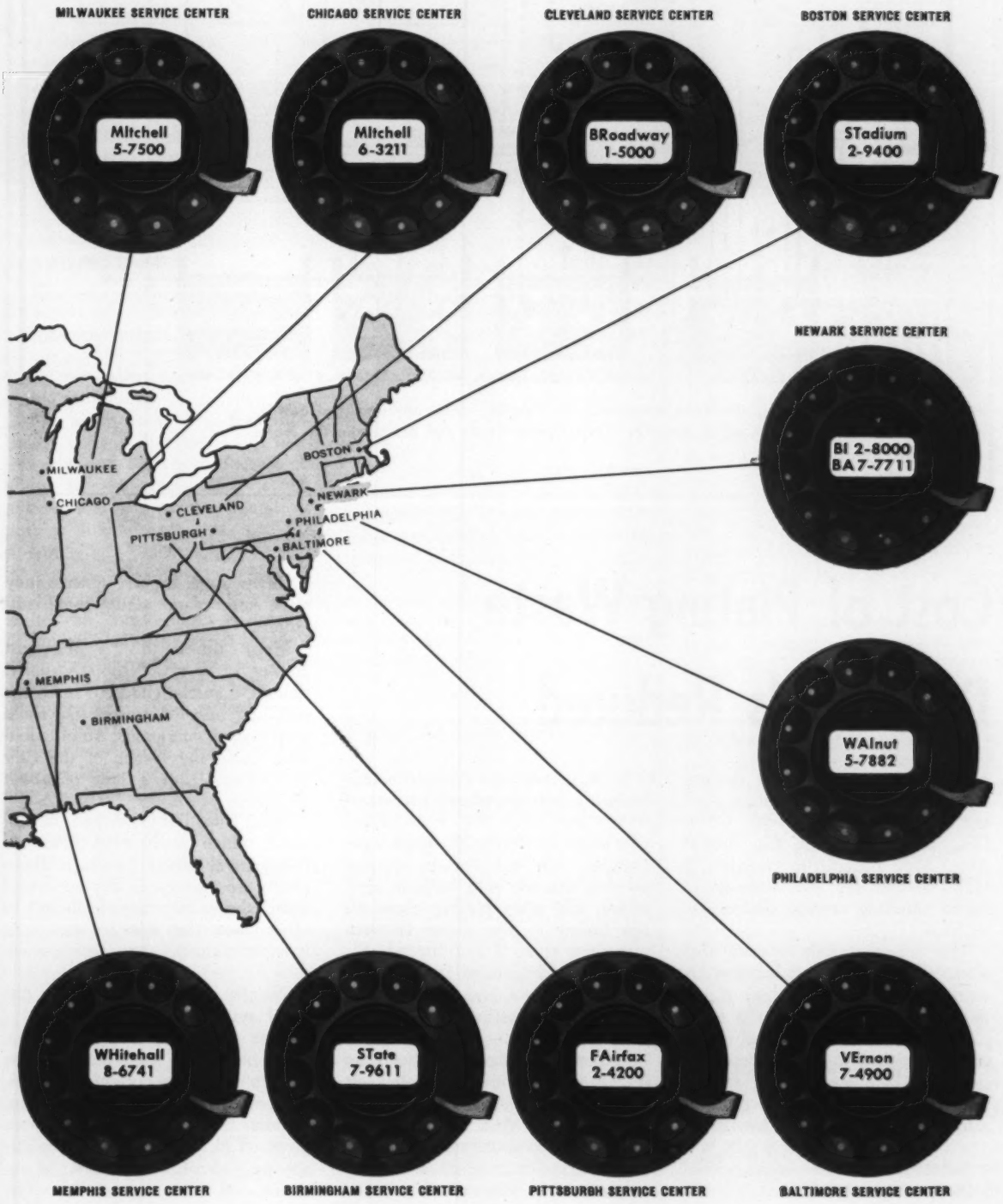
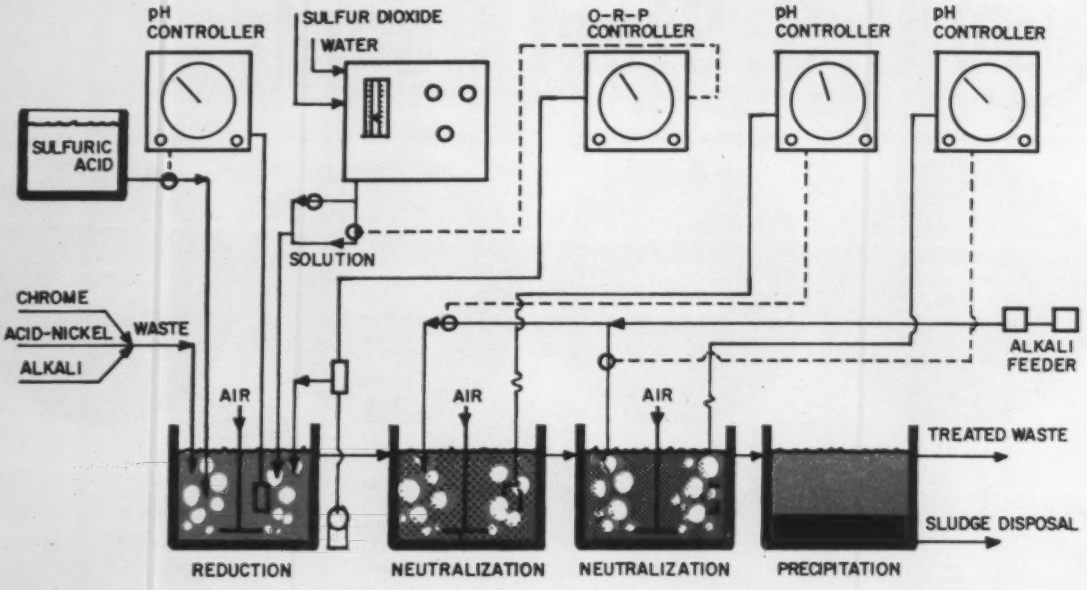


Simplified diagram shows flow arrangement. With it . . .



Plating wastes containing chromium compounds are treated. After adjustment of acidity, chromium is reduced with sulfur dioxide. Then neutralization can precipitate the metal in a sludge

Cost of Plating Waste Disposal Is Reduced

• SULFUR DIOXIDE is cutting costs in disposing of chromium plating wastes at the Sharonville, Ohio, Div., Electric Autolite Co. Saved: About $300 a month in materials, 3 manhours per day, plus other benefits in handling, storage, and maintenance.

The sulfur dioxide system also offers high reliability, is handled by automatic controls, and has eliminated an odor nuisance, the company states. Robert Winston, plant engineer, points out that the method can apply to other oxidizing agents, such as chromates, permanganates, nitrates, perchlorates, and peroxides.

• Substantial water consumption leads to disposal problems.

In Autolite's auto bumper manufacturing process, 60,000 gallons of water per hour are consumed—equivalent to 120 to 200 gallons per bumper. In the chrome plating process, chromic acid, sulfuric acid, nickel, and other plating chemicals are added to the water in such quantities that, if not treated, the waste would pollute streams, kill fish and animals, and corrode metal structures such as bridges and abutments.

Although plating shops attempt to recover valuable products from their wastes for re-use, there is always an accumulation. And when lines are changed, or solutions replaced, there will be larger concentrations of waste products to be disposed of.

• City sewage disposal systems may serve some plants under some conditions.

Many times, this is the best answer for a small shop. Usually, though, a special charge is made for handling unusual wastes like those from plating operations; Autolite had been using the system of the City of Cincinnati at a cost of about $40,000 a year.

Some cities limit the types of materials which can be discharged into the general sewer system. These plants do not have the option of using the community facilities; in other cases, they can be used only if a pretreatment step is performed.

• Autolite set up its own waste disposal system.

First step was to establish a treatment facility. A solid reactant was used to reduce the chromium wastes.

Handling reagents was a problem. Vapors from the chemicals were given off in handling and in the dissolving step which preceded the reaction of the chemicals. The

vapors irritated employees and caused corrosion of buildings and equipment. Moreover, Autolite reported that solids built up in the lines, occasionally plugging them.

Simplification of handling was in order. Metering the solid reactants was difficult, since there was caking or chemical change on storage.

• Liquid sulfur dioxide, metered into the system, reacts with the chromic acid waste.

At an additional cost of $1500 for installation in the existing system, it was decided to use liquid sulfur dioxide as the reducing ingredient. It is supplied in 1 ton containers by Ansul Chemical Co., Marinette, Mich. Ansul engineers also aided in the design and installation of the handling system.

Automatic controls were installed to adjust proportions of the chemicals used.

• Acidity control assures proper reacting conditions.

The waste going into the Autolite treatment unit is usually sufficiently acid for the necessary reaction to take place. If it is not, as measured by a pH meter, sulfuric acid is automatically fed into the stream.

Under acid conditions (pH 5.0 or less) the sulfur dioxide reacts with the hexavalent chromium (chromic acid) to form trivalent chromium (chromium sulfate). Flow rate of the sulfur dioxide is adjusted manually for nearly complete reduction. Then final reaction is carried to completion under the control of an oxidation-reduction potential meter which adjusts the flow of the final portion of sulfur dioxide which is needed.

Mixing is provided by air agitation.

The combination of manual and automatic control has resulted in smoother operation, Autolite reports. The preliminary tests were run with full automatic control on the entire sulfur dioxide stream. Here there was excessive cycling with the arrangement used. The combination of manual and automatic control has eliminated this, yet there is adequate protection against demand changes.

Final step in the process is the addition of soda ash (sodium carbonate). It precipitates the trivalent chromium along with the other metallic contaminants. They are allowed to settle in a rotary clarifier and are removed by vacuum filtration.

• The present system, while providing satisfactory treatment, has cut costs.

Autolite points to a saving amounting to about $300 per month on materials alone, compared with the dry chemical method. This has reduced the chemical cost by about 40 per cent per month.

There is a saving in manpower too. Adding the liquid sulfur dioxide takes little time, since most of the control is automatic. This amounts to about 3 hours per day, Autolite calculates. Handling and unloading costs are cut, and less manpower is needed for building maintenance, although these are smaller savings.

The containers of sulfur dioxide are stored outside, rather than in a warehouse. That frees building space for other uses.

The reducing chemicals are not handled manually, and no fumes are given off. That improves working conditions as well as reducing corrosion of equipment.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Titanium Clad Steel Sold

COMMERCIAL production of titanium clad steel plates is announced by Lukens Steel Co., Coatesville, Pa. The company has filled an order for 1½ tons of the material for E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. The material will be used in a processing plant reactor.

Titanium clad isn't a standard production item, but Lukens is taking orders for it on a development basis. Plates up to 1¼ in. thick, with a maximum cladding of 3/16 in., are available. The Du Pont order included a 204 by 64½ by ⅝ in. plate, of 22 per cent titanium on A-204 backing steel, and a 66¼ in. pressed head of the same material.

Capacability means

Dependability

When it comes to furnace maintenance refractories, *dependability* is Basic. You won't need the "Alpine Rescue Squad" if you rely on Basic's dead-burned dolomites, MAGNEFER and SYNDOLAG. For more than 40 years steelmakers have known these products as the standard of comparison for heat-to-heat furnace repair.

MAGNEFER and SYNDOLAG provide better bonding, greater density and higher heat resistance. Used in virtually every open hearth and electric steelmaking shop in the country, MAGNEFER and SYNDOLAG give you more advantages, more for each of your refractory dollars.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

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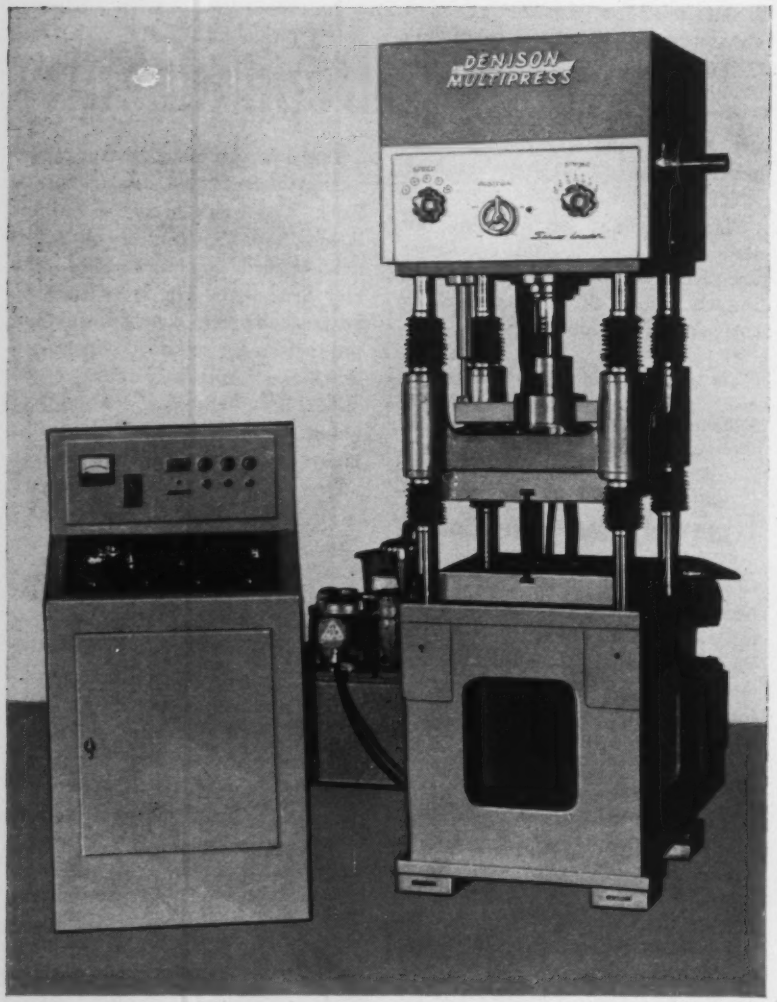
Speeding production of progressive stampings with new 600 stroke-per-minute hydraulic Multipress.



DELIVERING MORE THAN 600 RAM STROKES-PER-MINUTE *with 25-ton capacity, new Denison hydraulic Multipress "600" substantially increases speed and precision control of stamping operations. Note construction features, large daylight area, remote control console.*

By: J. S. Tipton

Product Manager,
Multipress Division
Denison Engineering Division
American Brake Shoe Company

Ever-increasing demand for faster, more productive equipment is a basic requirement of the metalworking industry today. And *progressive stamping* is one area in which there has been a particularly urgent need for higher speed precision press equipment.

To specifically meet requirements for faster and more efficient production in progressive stamping operations, Denison has developed the Servo-Driven Multipress "600"—a 25-ton hydraulic press capable of delivering over 600 ram strokes per minute. In addition to its high speed characteristics, this new press has special features that simplify operation, facilitate tooling set-up and change-over...and hold operating noise to a minimum.

FASTER TOOLING SET-UP

The Multipress "600" is a four-column, platen-type press with vertical frame. All four sides of the press frame are open below the bed, providing easy access for faster tooling set-up with reduced change-over time. Bed area between columns is 19½" x 19½". Maximum daylight is 11½", and this is adjustable by means of a simple screw-thread to a minimum of 9".

CONTROLLED BREAK-THROUGH

The press utilizes a closed-circuit servo drive hydraulic system, with harmonic cams for work strokes of ¼", ½", ¾", 1", 1½", 2" and 3". And the cams can be varied to provide special work strokes. Desired stroke length is readily selected by a dial control on the upper front panel. Punch breakthrough is adjustable by handwheel in a smooth, unbroken, continuous manner within the limits of plus-or-minus .250". A scale showing ram position in increments of .001" is adjacent to the handwheel. Elimination of positive stops results in quieter operation.

Take-off power for feed and accessory equipment is provided by a drive shaft projecting from both upper right and left sides of the press.

INSTANT ADJUSTMENT

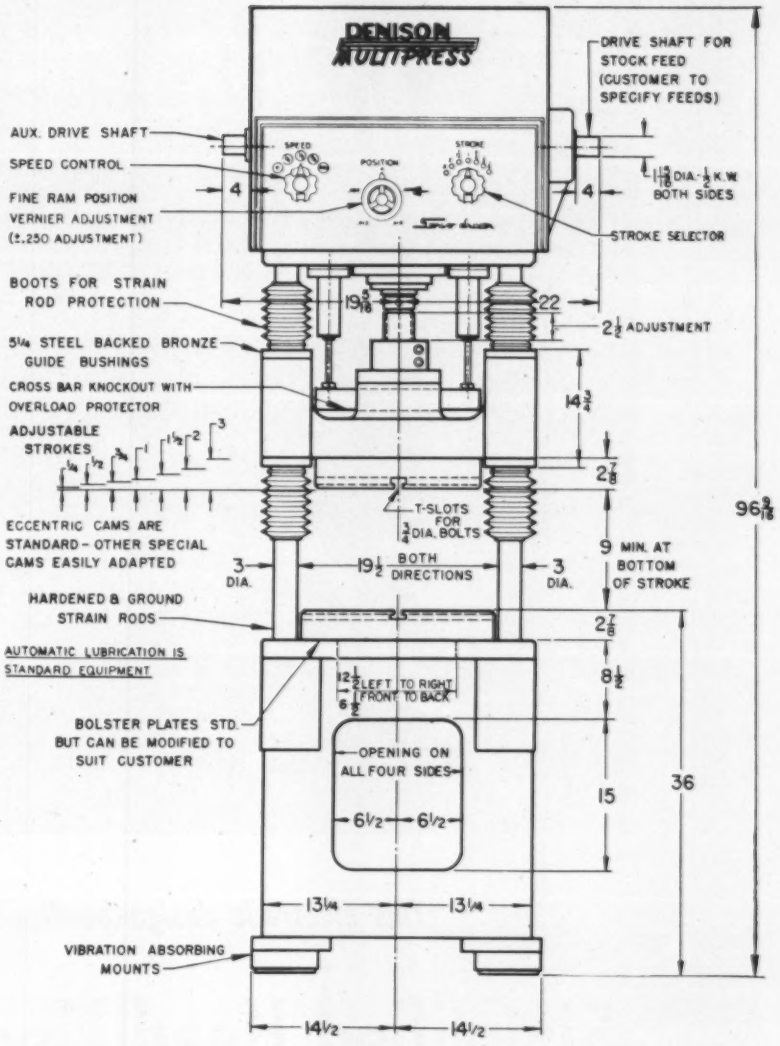
Another important feature of the new Denison "600" unit is that the number of ram strokes, as well as the ram pressure, can be changed while the machine is cycling. Speed of the feed drive shaft is automatically adjusted to any changes in the ram stroke through a servo-loop hydraulic system. This allows instantaneous changes to be made while the press is operating, with perfectly maintained sequencing between feed control and ram action.

Hydraulic power for the press is furnished by a high-low pressure, floor-mounted pump unit. For economical operation, the pump delivers full 25-ton pressure on the lower 20% of the ram stroke only. Ram pressure can be varied by a simple adjustment on the pump unit. On jobs requiring 15 tons pressure and less, full tonnage is available through the entire stroke length.

The pump unit and the press frame are mounted on vibration-absorbing shock mounts to hold noise level remarkably low.

REMOTE CONTROL

All electric controls are panel-mounted on a separate console which may be remotely positioned at any convenient location. These controls include cycle start/stop, motor start/stop, emergency reverse and a multi-selector switch


DENISON
MULTIPRESS
DRIVE SHAFT FOR STOCK FEED (CUSTOMER TO SPECIFY FEEDS)
AUX. DRIVE SHAFT
SPEED CONTROL
FINE RAM POSITION VERNIER ADJUSTMENT (±.250 ADJUSTMENT)
STROKE SELECTOR
BOOTS FOR STRAIN ROD PROTECTION
2½ ADJUSTMENT
5¼ STEEL BACKED BRONZE GUIDE BUSHINGS
CROSS BAR KNOCKOUT WITH OVERLOAD PROTECTOR
ADJUSTABLE STROKES
ECCENTRIC CAMS ARE STANDARD - OTHER SPECIAL CAMS EASILY ADAPTED
T-SLOTS FOR ¾ DIA. BOLTS
9 MIN. AT BOTTOM OF STROKE
BOTH DIRECTIONS
HARDENED & GROUND STRAIN RODS
AUTOMATIC LUBRICATION IS STANDARD EQUIPMENT
LEFT TO RIGHT
FRONT TO BACK
BOLSTER PLATES STD. BUT CAN BE MODIFIED TO SUIT CUSTOMER
OPENING ON ALL FOUR SIDES
VIBRATION ABSORBING MOUNTS
96⅜

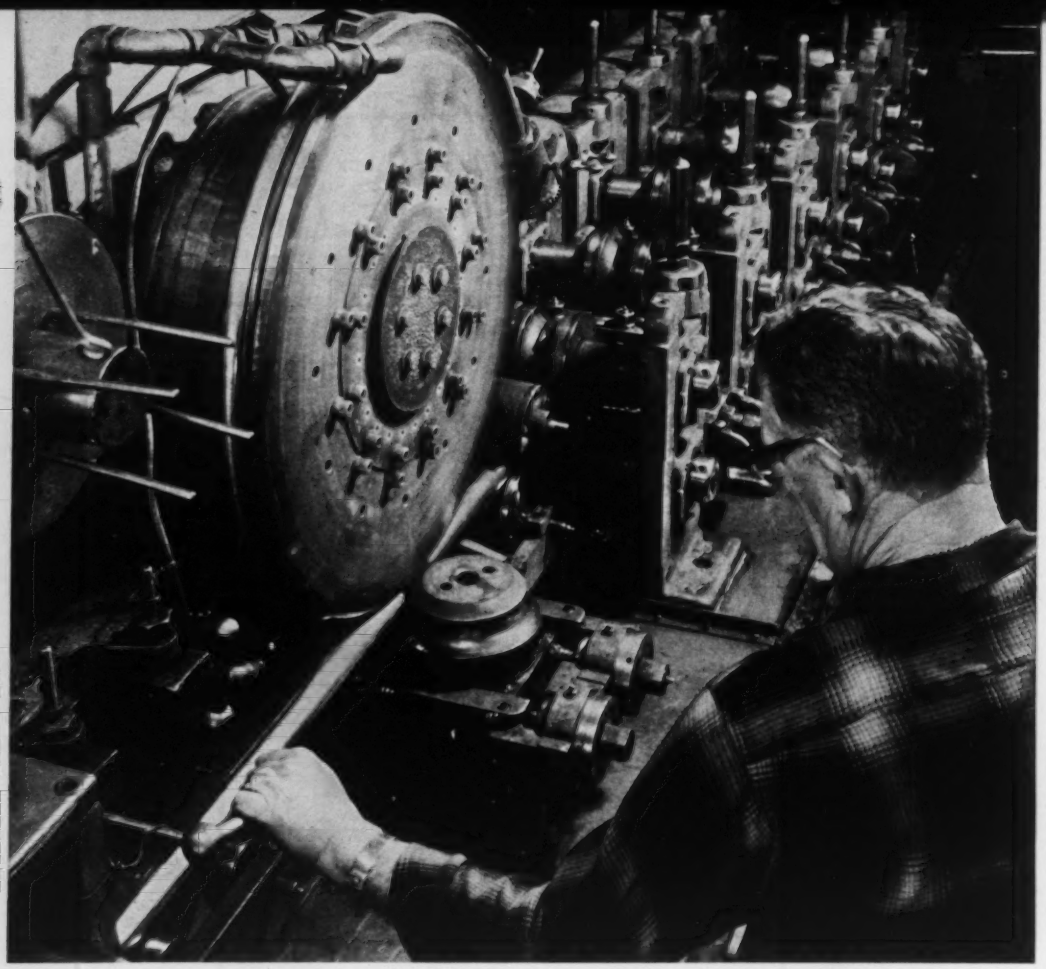
with positions of off, run, inch and inch-feed. As an optional package, the console may be equipped with an adjustable pre-count system that automatically produces a pre-determined number of parts.

Accessories available for use with the Multipress "600" include feed mechanisms, variable-speed straighteners and various types of bolster plates.

WRITE FOR FREE DATA

Data and specifications on the new Multipress "600", plus information on the complete line of 1-ton to 100-ton capacity Multipress units, are available from your nearby Denison hydraulic press specialist. Call him, or write for technical Bulletin M-42 and the new 26-page Catalog 120.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio



This electrode design handles more power, costs less . . .

Simplified Head Updates, Speeds

• PRODUCERS of welded steel tubing are the immediate beneficiaries of a new, more efficient tube mill announced last week.

Principal advantages claimed by Yoder Co., Cleveland, for its new design:

• The unit is more compact, has a cleaner look than previous models.

• It can weld from 20 to 60 per cent faster than older models with the same amount of electrical power (speed increases vary with type of metal).

• With a smaller investment, producers can obtain greater speeds in welding similar metals.

In addition, older mills can be modernized by replacing the welder rotating unit (electrode holder).

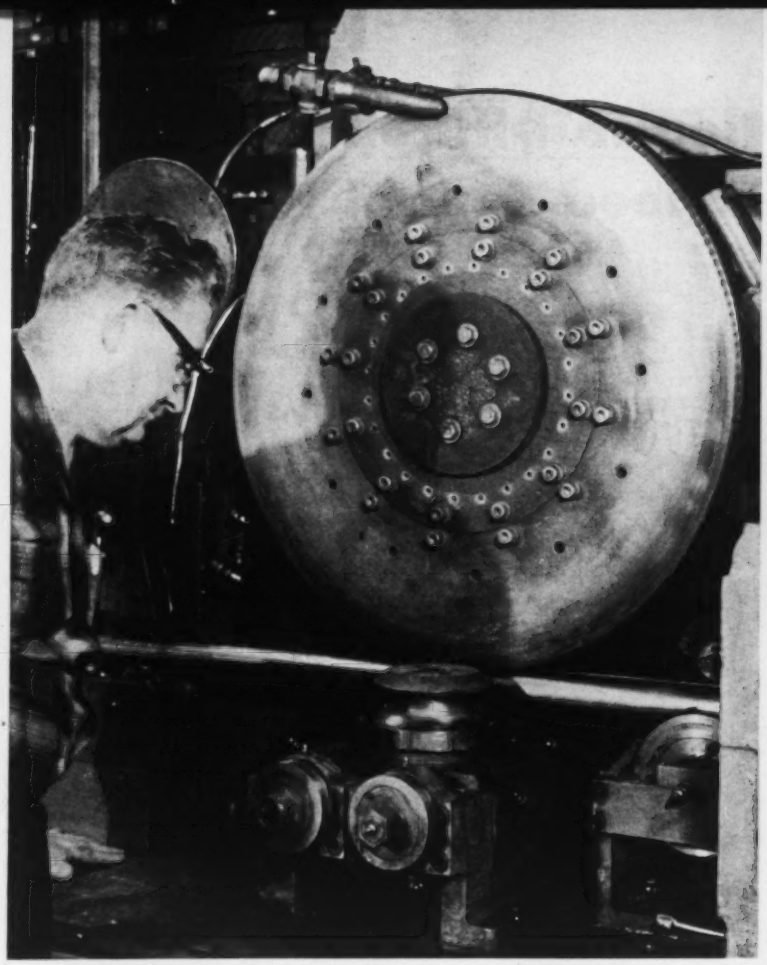
Such tube mills are employed by producers of automotive parts (exhaust piping, fuel lines, structural parts), architectural supports, and line pipe, says Yoder.

• Electrical improvements are centered in the rotating welder head. Electrical losses have been greatly reduced by redesigning and modernizing the components.

Steel strip fed through a Yoder mill emerges as a tube with edges in position for welding. As the tube passes beneath a two element wheel, an alternating (low frequency) electrical current passing from one element across the tube joint to the other raises the edges to joining temperature. Such tube mills are exceptionally fast—speeds of 1000 fpm in thin metals have been reported, although Yoder says mill speeds are normally about 50 to 80 fpm on steel 0.103 in. thick.

Kenneth Keska, Yoder's chief research engineer, points out that the new design achieves both compactness and increased efficiency. The transformer is mounted directly on the electrode support plate (welding wheel) and is an integral part of the plate—the transformer housing and inner electrode (a copper forging) are a single turn secondary, a feature that eliminates long, inefficient power leads.

The transformer core is ribbon wound with a grain oriented, silicon steel. Such a single piece con-



benefits new buyers and present users . . .

Welded Tube Mills

struction eliminates losses normally found in cores made with stacked strips which overlap at joints or corners. The primary is wound directly on the doughnut shaped core and sealed with an epoxy resin. After curing and machining to size, the unit is fitted into the copper secondary-housing piece and filled with a dielectric-coolant (Minnesota Mining FC-75), a colorless, odorless, nonflammable liquid which is practically inert, says Yoder. By comparison with ordinary transformer oils, the FC-75 liquid will transfer ten times as much heat for the same temperature rise. That permits the internal temperature to rise to 300° F safely.

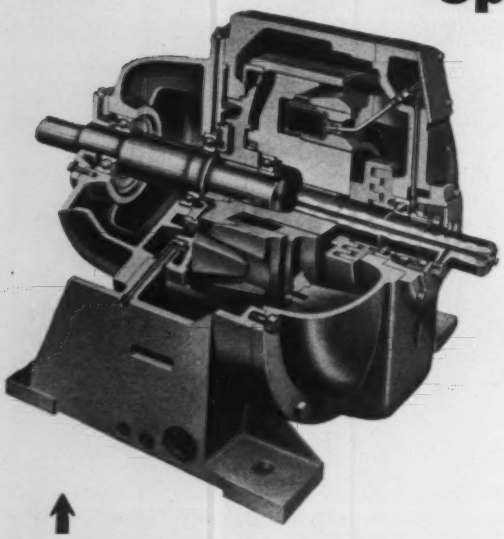
The unit is cooled with the same external water that cools tube and electrodes. Cooling system, filters, heat exchangers, and pumps required by older systems are no longer needed, explains Yoder.

• The new unit can be installed on older mills. Advances in material handling are the next step.

Tube mill operators can adapt the new Type V transformer-electrode unit to existing equipment. The unit can be built to fit existing power supplies. Result: Production speeds 20 per cent greater with the same power.

"The next advances we need for tomorrow's customer are better cut-offs and faster handling of finished stock," states Mr. Keska.

The BEST Solution to Difficult Speed Control Problems—

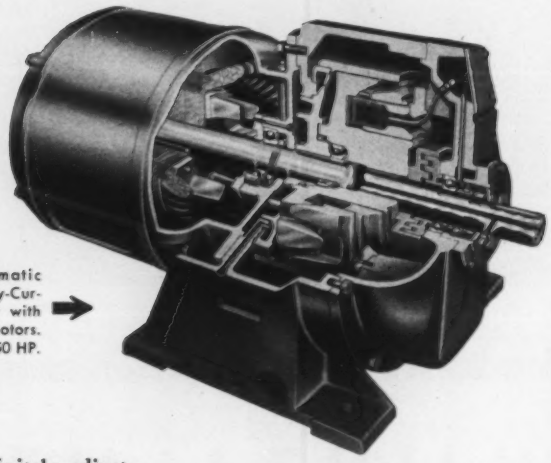


Dynamatic Liquid-Cooled Couplings provide infinitely adjustable speeds for nearly every application from 3 to 150 HP. Note the absence of slip rings, brushes, and commutators. Heavy-duty types with capacities up to 5,000 HP are also available.

EATON

DYNAMATIC®

LIQUID-COOLED EDDY-CURRENT COUPLINGS and DRIVES



"Dynaspede" Drives are Dynamatic Liquid-Cooled, Stationary-Field Eddy-Current Couplings mounted integrally with standard, D-flange, squirrel cage motors. Available in capacities from 3 to 150 HP.

Here's Why—

Dynamatic Liquid-Cooled Couplings and Drives provide infinitely adjustable speed from a constant speed source—or constant speed from a variable speed source. They operate on standard alternating current. Rotary power is transmitted through the coupling by an electromagnetic reaction between the driving and driven members of the unit—there is no mechanical contact of rotating members to cause wear and require adjustment or replacement.

A wide range of standard and special control features may be obtained from a remotely-mounted electronic control system. Infinite speed adjustment, constant speed control, on-off clutch control, torque limit, acceleration control, inching, and threading are a few of the many functions available. The addition of an eddy-current brake to standard couplings or drives provides smooth, cushioned stops and controlled deceleration.

Liquid-Cooled Dynamatic Couplings and Drives deliver more horsepower than other types of the same physical size, thus conserving space in a busy machine area. Efficient heat dissipation permits continued operation at low speeds, or stall with full load.

Completely enclosed, Dynamatic liquid-cooled units are protected from dust, dirt, and other atmospheric impurities. Dynamatic design involves no brushes or slip rings; there is no possibility of arcing. With simple modification these units can be made explosion-resistant for hazardous applications.

Infinitely Adjustable Speeds from AC Power

★

Smooth, Quiet Operation from Cushioned Starts

★

Wide Range of Control Functions

★

No Slip Rings, Brushes or Commutators

★

Completely Enclosed Design

★

Greaseable Bearings

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EATON

DYNAMATIC DIVISION

MANUFACTURING COMPANY

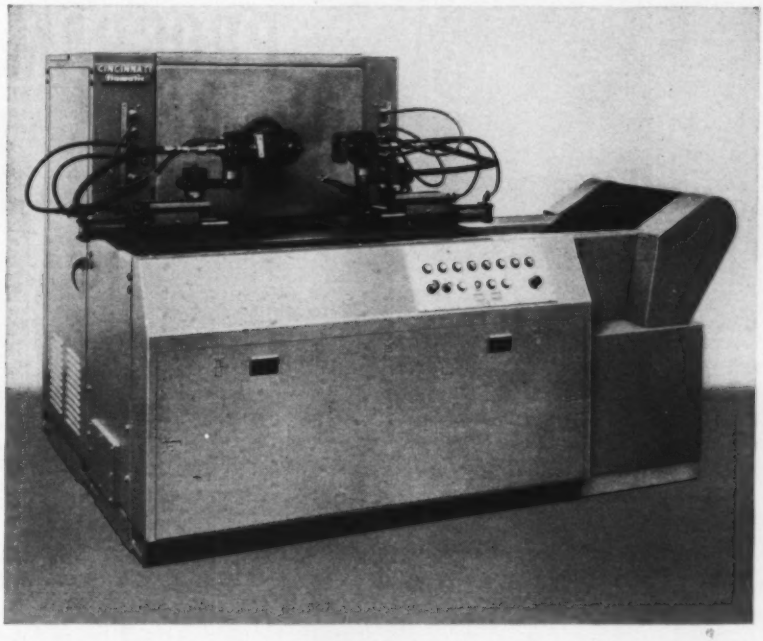
3122 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

Building Blocks Make Up Heat Processing Units

THIS flame heating machine is assembled from standard building block units.

A self-contained, No. 1 Flamatic, flame heating unit has been combined with a self-contained, conveyor type, quench tank to produce the unit shown here. The quench tank is one of a series of basket type and conveyor type quench tanks which may be used with either Flamatic or Inductron heating units. The Cincinnati, 5 kw, RF Inductron is a bench type, induction heating unit for small lot or production basis. The 1 kw, RF Inductron is a portable, bench type induction heating unit for small electronic components and for research laboratory requirements.

For further information, *write* Meta-Dynamics Div., Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati, Ohio.



Shaker Hearth Furnace Heats Work by Convection

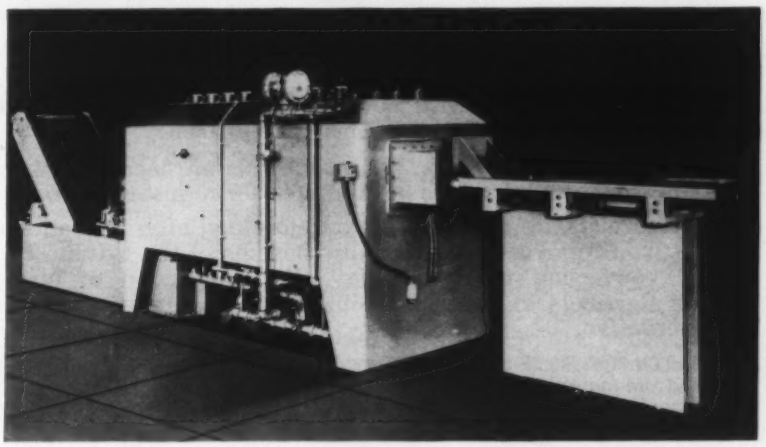
A CONTINUOUS production shaker hearth type, controlled atmosphere furnace heats work entirely by forced convection.

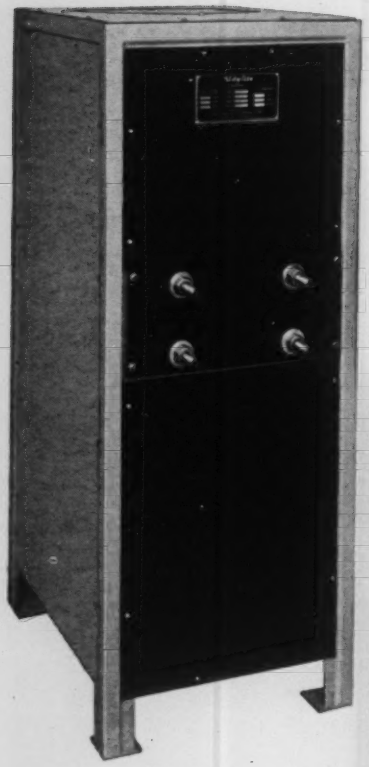
The unit includes a preheat vestibule, a two zone heating chamber, and a conveyorized quench tank. It provides uniform heating and quenching and produces a bright finish on parts.

It can be used for bright hardening, carbonitriding, and light case carburizing. Operating at 1550° F, the unit has a maximum heating capacity of 1000 lb per hour. Operating costs are minimal. With an automatic hopper feed, the furnace is capable of carrying work through preheat, heating, and quenching stages without further attention by the operator.

Refractory baffles in the heating chamber completely shield the work from direct radiation. Uniform temperature along the tray hearth and through the workload is maintained by forced convection (two centrifugal fans are used).

Ceramic heating tubes are vertically mounted; each is sealed at the bottom by a silicon O-ring. A stainless steel bellows seals the tube in compression and acts as a spring to allow for expansion and correc-





take advantage of the

NEW PROJECT ALERT RECTIFIER PROGRAM

Rebuild your old equipment now!

Now's the right time to let Udylite electrical equipment specialists rebuild your old, inefficient, 6-, 9- and 12-volt UM and UV rectifiers. You can obtain all of the advantages of a completely new silicon unit at a cost just slightly more than a silicon diode replacement kit. With the exception of the transformer, you'll have *a brand new rectifier from top to bottom.*

NEW, MODERN CABINET features slotted side panels for easy removal and replacement.

UNIFRAME CONSTRUCTION gives increased ruggedness, reduces overall weight.

NEW DIODE ASSEMBLY has newly-designed, one-piece, solid copper, finned heat sink and improved, non-aging silicon diodes with ceramic insulation and individual fuse protection.

NEW VENTILATION SYSTEM with new fan-housing assembly and permanent, built-in baffling assures highest ventilation efficiency.

NEW, LOW HEIGHT saves space. D.C. terminals are located in same relative position, thus new bussing is not required for re-installation.

All transformers are full-load tested before and after re-manufacturing. It will pay you to investigate the many benefits of the Udylite Project Alert factory conversion program today. For conversion of other old-style Udylite Rectifiers to economical silicon units, contact your local Udylite Representative.

SILICON CONVERSION KITS—Udylite Silicon Diode Kits are also available for UV and UM rectifier conversion right in your plant. A specially fabricated heat sink assembly, complete with diodes and fuses, permits fast, easy installation.

Udylite

The Udylite Corporation
Detroit 11, Michigan

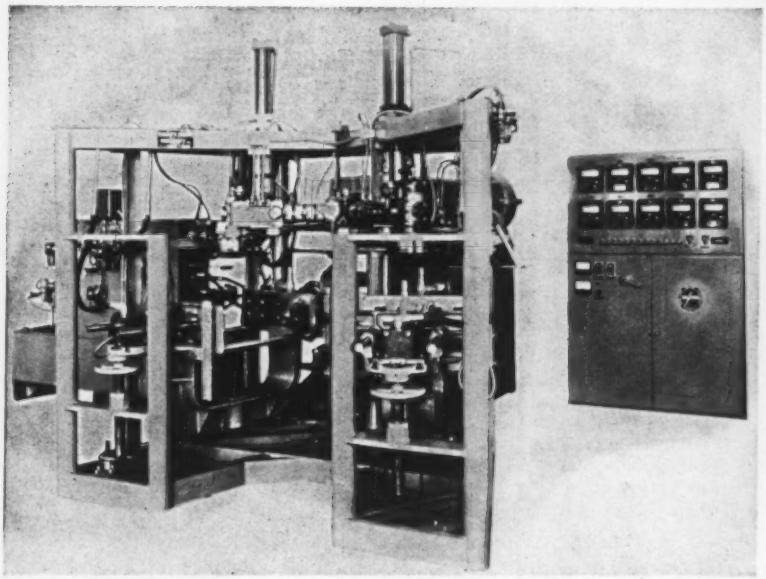
udylite

tion of any misalignment. A 100 per cent premix, high capacity burner fires upward to help assure complete combustion within the heating portion of each tube so that no visible flame is seen at the tube end.

Also announced is a high vacuum heat treating furnace (Series VFC-150) that features fast heating up to 2400° F and fast cooling. Maximum vacuum: 0.1 in. Hg. The unit has a work space 15 in. wide, 24 in. deep and 10 in. high. Typical applications include brazing of stainless and annealing of refractory metals and special alloys.

More favorable performance and lower operating costs are the results of changes in the V-300 (now designated VFC-300) automatic, vacuum, heat treating furnace. Changes were made in the pumping, cooling, and control systems. It has a work space 24 in. wide, 36 in. deep, and 12 in. high, an operating temperature of 2200° F, and an operating pressure of 0.1 micron Hg.

For further information, *write* Ipsen Industries Inc., Rockford, Ill.



Plastic Molder Uses Piston Accumulators

PISTON accumulators on the V-21 OHP Diversamatic blow molding machine act as material reservoirs and provide the high pressure required for fast parison extrusion.

Mounted between the extruding head and the die at each of the machine's two blowing stations, the accumulators make possible a continuous flow of material (one fills during the cooling cycle while the other forces out the parison into the space between the open dies).

The feature permits production of different items on the same machine, or simultaneous use of one station for production and the other for testing. The breaker plate and the extruder screw at the front of the machine can be removed without disconnecting the blow molding machine from the extruder. Color changes are easy to make.

The Diversamatic is available with two, four, or eight blowing heads. With four heads, or two at each station, the machine can produce 700 detergent bottles (1 quart size) per hour. With eight heads, or four at each station, it can make 1400 per hour.

For further information, *write* Modern Plastic Machinery Corp., 64 Lakeview Ave., Clifton, N. J.

Thermosetting Adhesive Cures at Low Pressures

A HIGH strength, thermosetting, film adhesive which can be cured at low pressures for metal to metal and metal honeycomb sandwich bonding is available from 3M's Adhesives, Coatings & Sealers Div.

The adhesive (Scotchweld Brand AF-110) can be cured at 10 to 25 psi. The company says the only pressure necessary is that required to provide contact and proper alignment between the parts.

Eliminated are elaborate or expensive jigs and fixtures for pressure application. The adhesive is applicable to production jobs.

The adhesive has metal to metal shear strengths of 4700 psi at 75° F and over 4000 psi at 180° F service temperatures. When properly cured, the company says the adhesive has excellent resistance to vibration and shock, water, oils, fuels, and salt spray. Cure time depends on the cure temperature used (325 to 450° F), methods of heat application, production limitations, and bond properties required. The recommended cure time for bonding at 350° F is 60 minutes. More rapid cures can be accomplished at 350° F or higher if the adhesive's maximum strength properties are not required.

For further information, *write* Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

Linear Movement Provided By Motor Powered Device

LINEAR MOTION can be obtained for applications that require it from Moduline motocylinders with Guardistor motors. Basically, the motocylinder is a gear motor with a high torque, high slip, intermittent rated, electric Guardistor motor with an oversize, magnetic, disc type brake.

A crank is mounted on the output-shaft and is machined to receive cams which actuate limit switches mounted on the upper part of the gear housing. The cams and limit switches can be adjusted to stop the crank pin at around-the-clock positions.

Manual pushbutton controls or

CM METEOR Electric Wire Rope Hoist

½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous hoist-duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

CM HOISTS

FOR { REPETITIVE PRODUCTION APPLICATIONS OR RUGGED MAINTENANCE WORK

HAND or ELECTRIC—CHAIN or WIRE ROPE

CM makes them all! So you can choose a hoist that's perfectly suited to your own needs in a safe, highly efficient CM design. Three of the most popular models are illustrated. Specifications of other types and sizes on request.

CM LODESTAR Electric Chain Hoist

⅛ to 1 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting mechanical brake and regenerative electrical braking. Overload protection and upper-lower safety switches. CM-Alloy load chain.

CM CYCLONE Hand Chain Hoist

¼ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

ALSO CM Pullers, Trolleys and Cranes

CALL the CM distributor for catalog, prices and fast delivery from stock.

CM HOISTS

CHISHOLM-MOORE HOIST DIVISION

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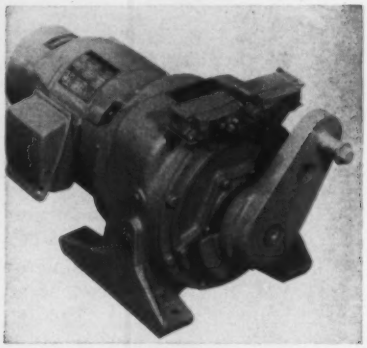
NEW PRODUCTS and equipment



automatic timing controls can be used for starting purposes. The rapid accelerating and braking action of the motocylinder enable the connected thrust rod to perform a wide variety of functions.

For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Machine Cuts 6 in. Tubing

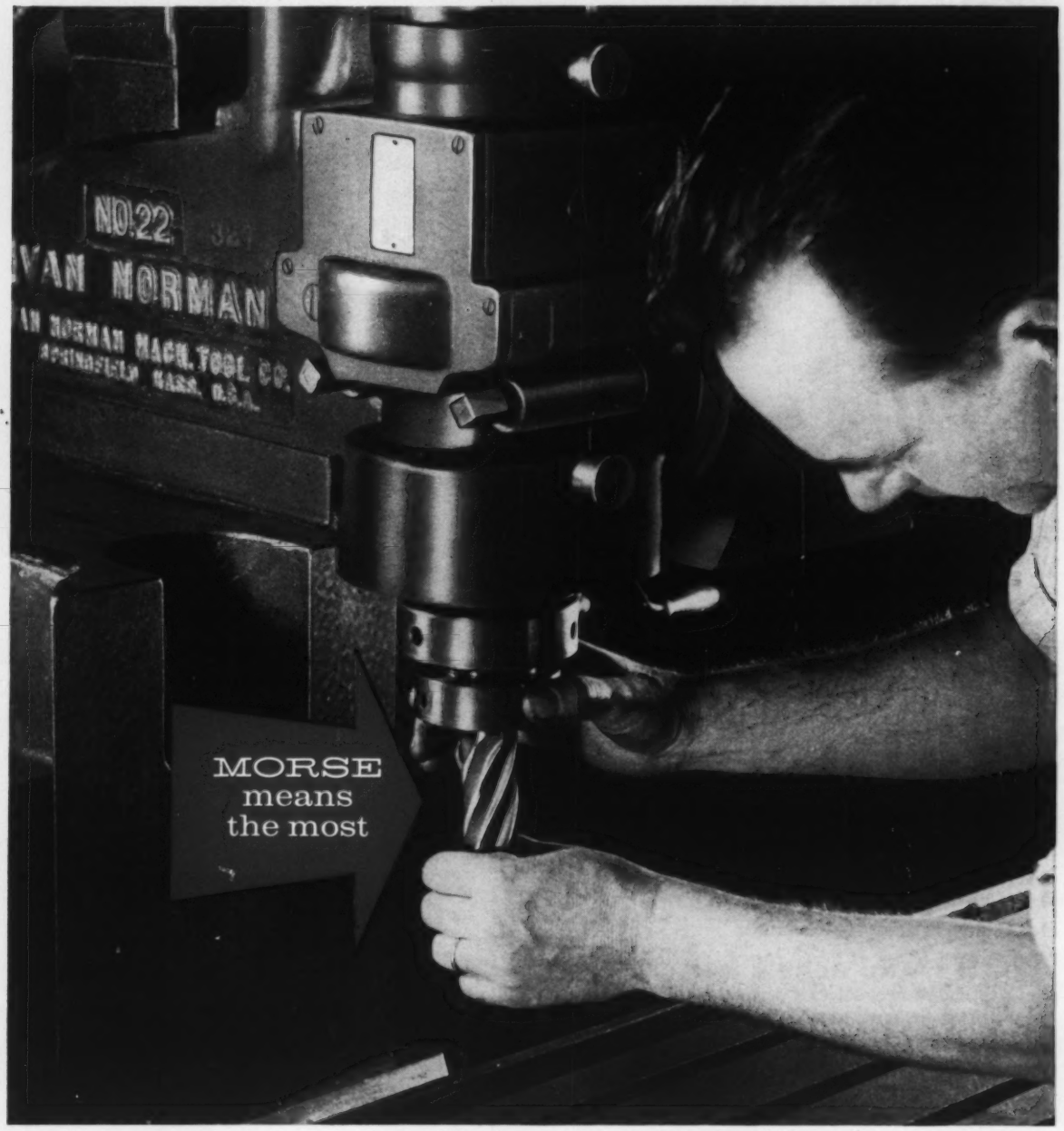
AUTOMATIC cutoff of tubing up to 6 in. OD with wall thickness ranging from 0.050 to 0.250 in. is performed with a standard, flying shear, cutoff machine designed by Alpha.

The company says advantages of the 200 ton unit include minimum lengths at maximum mill speed, accuracy in cut lengths, and better quality of cut. The unit is set up to cut out bad sections of tubing. Short test samples can also be cut.

The unit operates with a mill, automatically producing cut lengths of boiler or structural tubing. The machine cuts round, rectangular, square, or other shapes at a maximum rate of 300 ft per minute. It's capable of 20 cuts per minute.

The two point, four post press has the crankshaft parallel to die

with men who know cutting tools... it's MORSE everytime



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SEE YOUR NEARBY MORSE DISTRIBUTOR

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MORSE TWIST DRILL & MACHINE CO.
NEW BEDFORD, MASSACHUSETTS

A Division of VAN NORMAN INDUSTRIES, INC.

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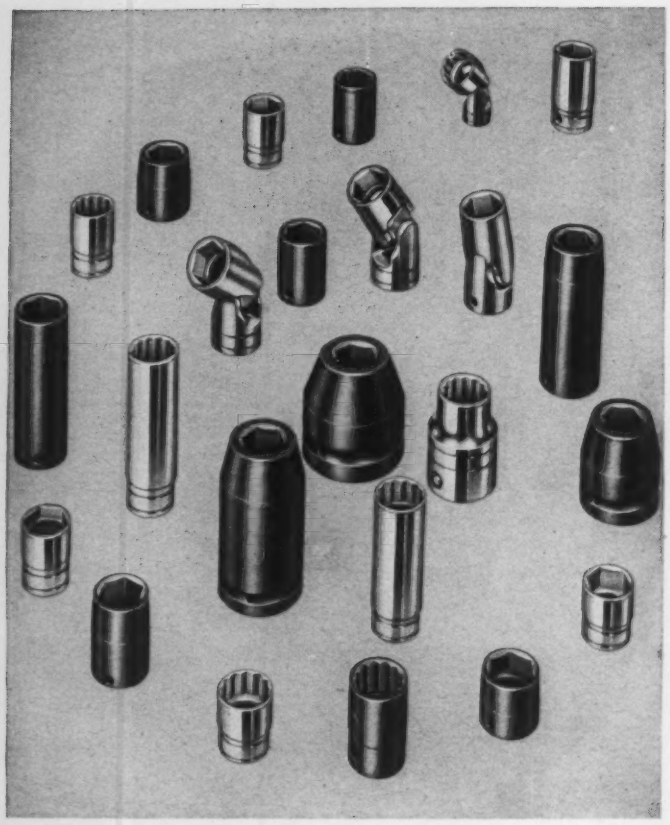
WAREHOUSES IN: NEW YORK • CHICAGO • DETROIT • DALLAS • SAN FRANCISCO

what? all these Snap-on sockets to drive just one size nut?



yes — AND HERE'S WHY: Every ¾-inch socket shown here solves a particular industrial nut-running problem. *Snap-on* makes this variety of ¾-inch hex wrench sockets and many more sizes and styles to give you just the one you need to match the job you have to do. Standard length, bolt clearance length, magnetic, Flexockets, power, power-impact and thin-wall types let you choose the socket to do your job faster and more efficiently, with less breakage.

ASK YOUR Snap-on MAN — If you have a production or maintenance problem involving special socket design or application, or any other question on tools, talk it over with your *Snap-on* man. He is a specialist who devotes all his time to industrial application of *Snap-on* tools. Write us or call your nearest *Snap-on* branch. Free catalog of industrial wrenches and hand tools is yours for the asking.

FOR ALL INDUSTRY

SNAP-ON TOOLS

8121-F 28th AVENUE • KENOSHA, WISCONSIN

NEW PRODUCTS and equipment

travel. It is equipped with a die acceleration unit for starting and returning the die.

For further information, *write* Alpha Press & Machine Inc., Detroit, Mich.

Portable Unit Detects Flaws in Ferrous Metals

A PORTABLE magnetic device offered for detecting cracks and flaws in ferrous metals is essentially a powerful, U-shaped, two pole electromagnet which can be energized from a 6 or 12 volt automobile storage battery or from a 110 volt service outlet through a built-in rectifier.

The detector is placed so the two poles bridge the area to be examined. When the power is switched on, lines of nonreversing magnetic flux flow through the specimen. To make the flux pattern visible, a surface coating of ferromagnetic powder is sprinkled over the 72 sq in. area that can be covered in one test. The particles align themselves in a pattern duplicating the outlines of any flaws.

The company says little, if any, operator training is necessary to permit detection of invisible hairline cracks or flaws as deep as ½ in. below the surface. The unit was developed by United States Casting Repair Co. and is being marketed by Westinghouse.

For further information, *write* X-Ray Dept., Westinghouse Electric Corp., P. O. Box 416, Baltimore 3, Md.

Flexible Cushion Coupling Handles High Torque

A HEAVY duty, flexible cushion coupling (PX280 Para-flex) is designed for high torque requirements. It has more than twice the torque capacity of the next smaller size in the Dodge line.

The unit features the standard, tire shaped, flexing element to accommodate angular and parallel shaft misalignment, and to absorb end float,

COLD ROLLED STRIP STEEL

made for YOU

by THOMPSON

There is a difference in Thompson Steel... it's made to your specifications. From the moment your order is received, it is individually processed to have the accuracy, the hardness, the finish—all the physical and chemical properties you must have to make your part on your tools economically and efficiently.

Thompson can make the steel that guarantees you product satisfaction. We have the very latest in strip mill equipment; workmen who have spent their lifetimes accumulating steel "know-how;" standards of quality that have never been compromised.

There is a difference in Thompson Service. Phone today. You'll be connected to a man who not only will get your order started properly and without delay, but who like all of us at Thompson's has a sincere desire to be helpful. Your order will be shipped direct from our mill, saving you time and money.

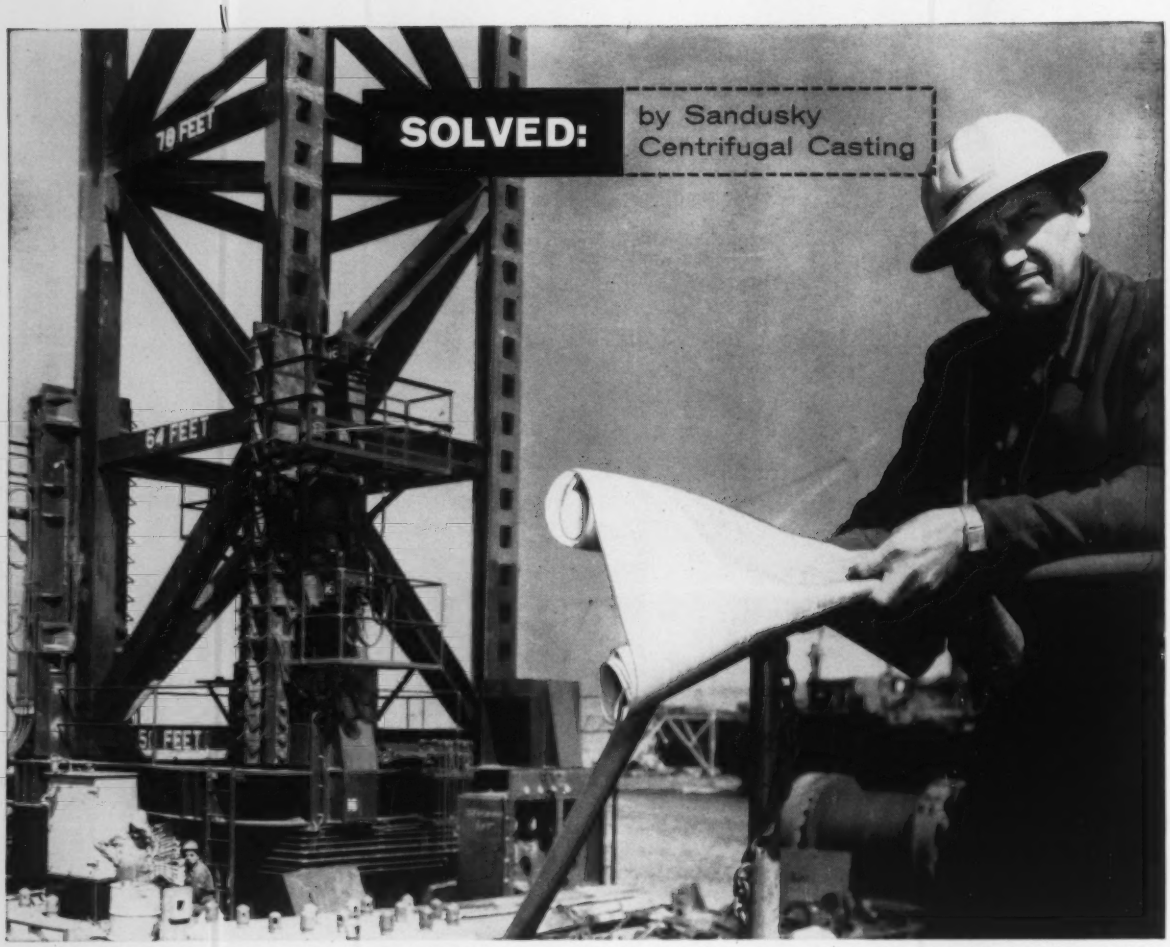
THOMPSON WIRE COMPANY Steel

THE QUICK SERVICE MILL

Mills Strategically Located to Serve You

THOMPSON WIRE COMPANY

9470 King St. Franklin Park, Ill. NAtional 5-7474	27840 Groesbeck Hwy. Roseville, Michigan PRescott 5-6804	41 Mildred Ave. Boston 26, Mass. CYpress 8-6550	115 Stafford St. Worcester, Mass. PLeasant 6-4643	North Point Road Baltimore, Md. ATwater 4-8500



One of four 274 ft. high towers aboard the *George F. Ferris* showing method of installing hydraulic jacks built by Yuba Manufacturing Division, Yuba Consolidated Industries, Benicia, Calif. George Bauer, of Delong Corp., New York, is shown supervising construction while platform is being completed at Yuba's Richmond, Calif., plant.

YUBA gets quality-cost-delivery advantages by specifying 16 Sandusky cylinders

Sixteen 500-ton hydraulic jacks built by Yuba, for which Sandusky supplied the main cylindrical bodies, enable the new pipe-laying barge, *George F. Ferris*, to operate in waters 200 ft. deep!

This 5400-ton barge is equipped with four structural steel towers 274 ft. high. Four jacks on each of the towers provide the power to lower these steel "legs" to the ocean floor, raise the barge above the surface of the water, or retract the towers to render the barge navigable. The steel jack cylinders are Sandusky Centrifugal Castings, made to the requirements of ASME Code-approved SA-217, Section VIII, Unfired Pressure Vessels, to withstand operating pressures of 3000 psi. They were produced in 186" lengths, machined to 24" O.D. with 2" thick walls and sectioned into four pieces 43" long.

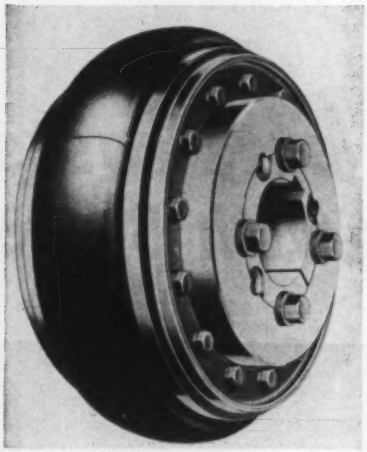
Yuba's selection of Sandusky Centrifugal Castings was based largely on three essential factors: QUALITY—meeting the exacting Code requirements . . . COST—saving about half the cost of an alternate method of manufacture . . and DELIVERY—coming through on a tough time schedule by delivering all 16 cylinders within 21 working days!

When you need cylinders from 7" to 54" in O.D. and up to 33 feet long it will pay you to get in touch with us. Write for our latest booklet, *Your Solution To Cylindrical Problems* containing data on more than 70 ferrous and non-ferrous alloys.

SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.

5902

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys



shock, and vibration. The coupling can handle 400 hp per 100 rpm; capacity at maximum recommended speed of 910 rpm is 3640 hp.

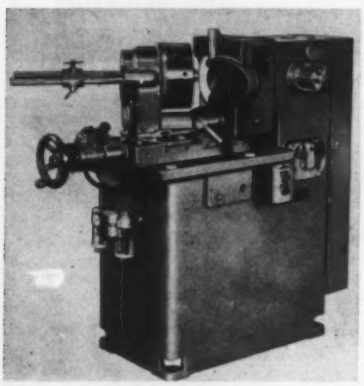
It's available from stock with Taper-Lock bushings for shafts up to 7 in. in diameter, or it can be ordered bored to size for shafts as large as 9 in.

For further information, *write* Dodge Mfg. Corp., Mishawaka, Ind.

Drill Pointer Uses Scroll Type Chuck

THREE styles of the Model 600 drill pointing machine are available. The unit has a scroll type chuck mounted in antifriction bearings. Lubrication is provided by an automatic recirculating system.

The chuck is controlled by a quick acting, positive drive. The company says the integral quill-clutch con-



(*Please turn to Page* 179)

JF Series

SAFE, RELIABLE POSITIVE CONTROL

Convenience, positive control and protection for the operator are provided by the pistol-grip, push-button control station of the Coffing Quik-Lift electric hoist.

Loads can be raised or lowered while pulling a trolley mounted hoist since a strain cable is incorporated in the control cord. The control station is made of non-conducting, impact resistant plastic and the 115 volts at the station plus the interlocked push buttons make for safe operation. The V-type brake assures positive control of loads. Housing is of strong but light aluminum which makes for portability.

Ask your distributor about the twenty JF models with capacities ranging from ¼ to 2 tons or write for Bulletin ADH-65BB.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center, Pittsburgh 22, Pennsylvania

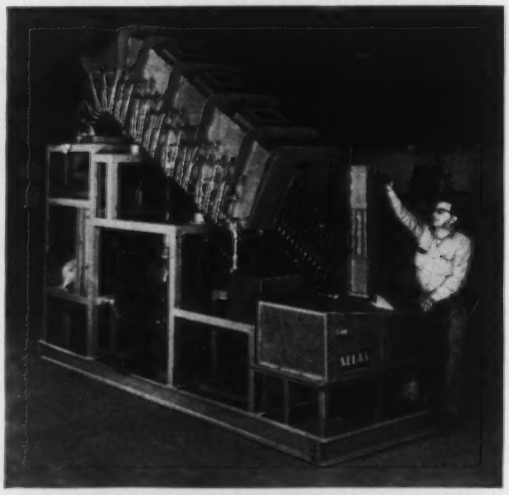
COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

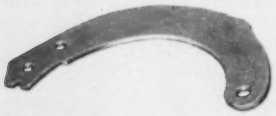
NEW SLANTS ON HEAT PROCESSING FROM SELAS

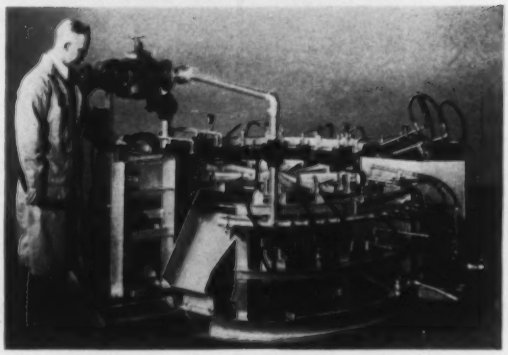
here's how industry cuts costs product quality with Selas



FORGING *Continuous unit fits compactly into production line to heat alloy steel bars for forging into C-shaped rail anchors. Production is synchronized with the forging bulldozer, up to 620 bars per hr. Inventory of work-in-process is ⅓ to ¼ of previous equipment . . occupies 20% less floor space . . reduces scale 95%. Precise heating assures consistently uniform grain structure and hardness.*

BRAZING *Compact machine automatically silver brazes Carboloy cutter to stainless steel shredder ring used in garbage disposal units. Precise fixturing, localized high-speed heating and automatic unloading permits one operator to produce up to 200 pieces per hr. . . Completely shop-assembled at Selas, unit was installed in customer's plant, ready for production operations, within hours.*





SELECTIVE HARDENING *End portions of brake shoe webs are hardened to create a more durable product. An indexing conveyor brings the two ends of webs under Duradiant burners. Designed for automatic loading, the machine heats, quenches, tempers and mechanically unloads the selectively-hardened work pieces. Service life of webs has been extended, costs have been reduced.*

. . . improves heat processing equipment

ANNEALING *Six-station dial conveyor automatic machine anneals a narrow band on stainless steel auto hub caps. Workpieces rotate above burners, bringing 2-in. wide band to 1800°F. in 30 sec. Production is 600/hr. Only 6 ft. 6 in. in diam., unit is located directly in the press shop production line.*

The installations on these pages demonstrate how Selas automatic heat processing equipment

- cuts operating costs
- increases production rates
- minimizes in-process inventory
- reduces labor requirements
- saves valuable floor space
- improves product quality

Specifically designed and custom-built to meet your individual production requirements and job specifications, Selas heat processing equipment employs time-proven standardized engineering features for longtime operating dependability and minimum initial investment. Problems usually associated with divided responsibility are avoided since Selas starts-up and services every machine it designs and builds.

Selas automatic or semi-automatic heat processing equipment can help you produce better products at lower costs. At your convenience—without obligation to you—a Selas field engineer would welcome the opportunity to survey your requirements.

For this free, personal service, or for literature on any of the heating operations shown here, write Mr. W. B. Troupe, General Industry Division.

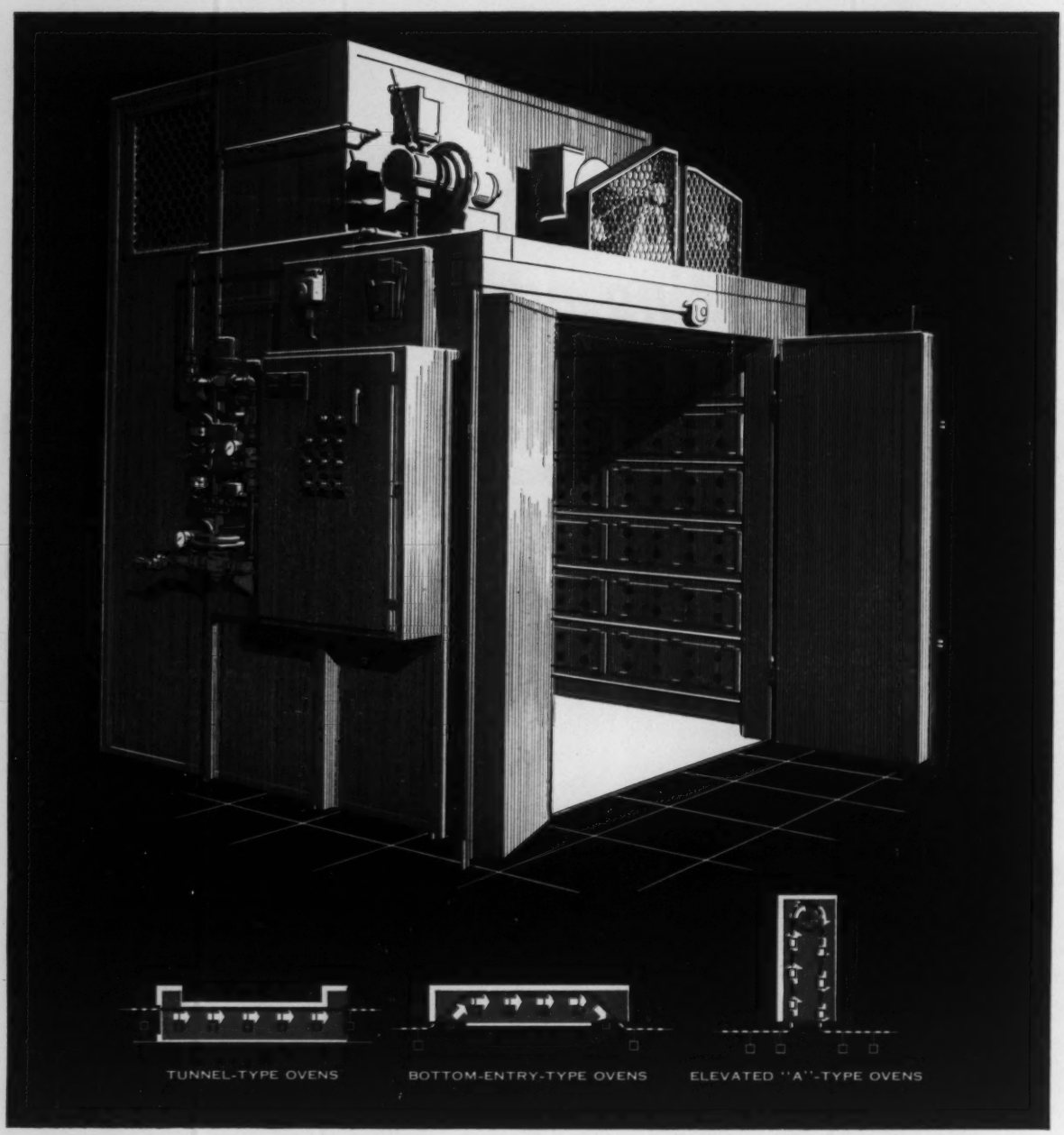
SELAS CORPORATION OF AMERICA
26 Dreshertown Road, Dresher, Pa.

EUROPEAN SUBSIDIARY: Selas Corporation of America, European Div., S.A., Pregny, Geneva, Switzerland. INTERNATIONAL AFFILIATES: FRANCE—Societe Exploitation de Produits Industriels, Paris; JAPAN—International Machine Co., Ltd., Tokyo. BENELUX, PORTUGAL, SPAIN—Union Chimique, Brussels.

SELAS

HEAT AND FLUID PROCESSING ENGINEERS

DEVELOPMENT
•
DESIGN
•
CONSTRUCTION



Batch-type ovens from DeVilbiss are your answer when you need fast, uniform baking, drying, dehydrating, preheating, or curing. They come knocked down or assembled in a choice of sizes, capacities, and heating media—to give you a "custom" oven at a standard price. DeVilbiss' engineering and experience assure the best oven—packaged or specially designed—for you.

Talk to DeVilbiss about all your industrial baking and drying needs

FOR TOTAL SERVICE, CALL
DEVILBISS

THE DeVILBISS COMPANY, Toledo 1, Ohio. Also Barrie, Ontario; London, England; São Paulo, Brazil. Branch offices in principal cities.

(*Continued from Page* 175)

struction makes it possible to get the unusual grinding motions out of time. The chuck is easily adjustable.

The unit will grind righthand drills in the 2, 3, or 4 flute style in a size range from ½ to 3 in. in diameter. All flutes are ground in one continuous motion. The variable clearance and variable included point angles (80 to 160 degrees) are instantly obtainable.

For further information, *write* Oliver Instrument Co., Adrian, Mich.

High Speed Featured On Bending Presses

TWO large bending presses developed by Pines are said to make possible substantially increased output and reduced production costs on tube and pipe bending operations in sizes up to 3 in. (diameter) and larger.

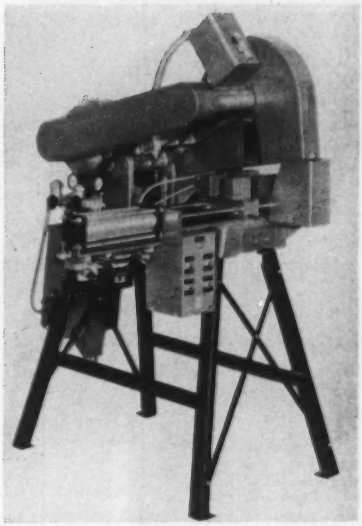
The machines are 30 and 40 ton capacity models and have the same production features as the Model 20-T. Production speeds three to four times faster than conventional bending methods can be achieved on the machines, says Pines. Smooth, good quality bends are produced on work up to the equivalent of 3 in. OD x 0.125 in. wall steel tubing. The Model 40T handles work with heavier walls and in large diameters. Production speeds up to 800 bends an hour are attained.

For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

Unit Cuts Both Ferrous, Nonferrous Tubing, Bars

A VERSATILE, 14 in., air operated, cutoff machine handles ferrous and nonferrous tubing, extruded shapes and bars.

The unit is automatic. Electric controls are provided for the cutting head and material feed. The machine cuts most shapes to 3 in.



in standard bar lengths, solid stock to 1¼ in. The feed stroke is variable from 3/16 to 8 in. It can be set up quickly for semiautomatic or completely automatic cycling and can be used for short run and maintenance type cutting.

The workfeed jaws are air powered and hold material on both sides of the cutting blade (allowing the use of narrow blades or wheels). Air and hydraulic control for cutting feed provides longer blade or abrasive wheel life.

Cutting speeds to 1500 pieces per hour have been reported. The 14 in. wheel travels at 3000 rpm. Spindle diameter is 1 in. It operates on 30 to 100 psi and averages 2½ to 4 cu ft per minute on continuous duty. Spindle drive motor is rated at 5 hp, 220/440 volts, 3 phase.

For further information, *write* Power Control Products Inc., Vicksburg, Mich.

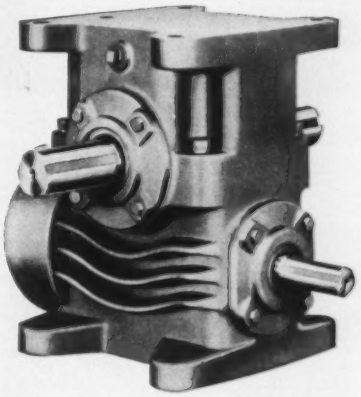
Tool Presetter Saves Time On Automatic Machines

A PRECISION tool presetting machine made by Microbore Div., DeVlieg Machine Co. is set up to reduce idle time of numerically controlled machine tools during tool changing.

It enables cutting tools to be preset for both diameters and depths. The unit can handle boring bars, milling cutters, drills, and other accessory tooling.

The machine has a precision pre-

A Morse answer



Eberhardt-Denver

poweRgear®

...when the problem involves heavy duty and reliability

High horsepower capacity
Oversize shafts
Extra-large bearings
Heavy-duty gearing
Universal mounting
All types available
Fractional to 53 hp. loads
Ratios 5:1 to 3600:1
Center distances 2" to 7"
Distributor-stocked

Got a speed-reducer problem? Call your Morse distributor in the Yellow Pages.

MORSE

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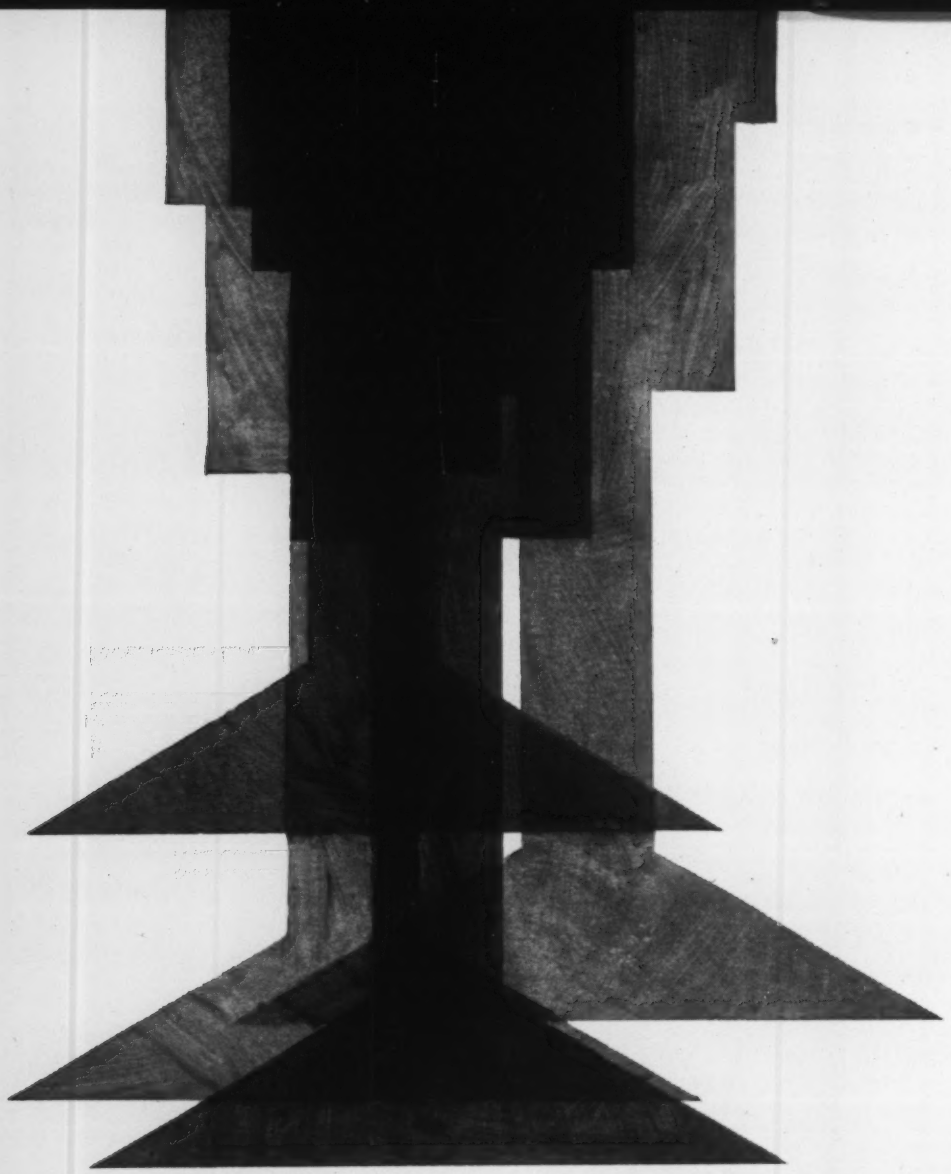
BW

Morse Chain Co., Dept. 2-61, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.



Improved Kaiser Permanente 84 Ramming and Patching Mix

BOND STRENGTH SIX TIMES GREATER!

From steel-making surface down to hearth brick . . . from cold start-up to operating temperatures . . . improved Permanente 84 rammed bottoms and patches have dramatically greater bond strength. ■ The table below shows cold crushing strengths up to six times greater for new Permanente 84—developed from one end of the critical temperature zone to the other. These strengths are achieved without sacrificing refractoriness under load. Permanente 84 goes directly from strong chemical bond to strong ceramic bond. High density is preserved throughout for greater protection against penetration, erosion, impact, and thermal shock. ■ For information and new technical folder about improved Permanente 84—or its companion Permanente 165 ramming mix—contact your Kaiser Sales Engineer, or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. □ □ □ □ (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

COLD CRUSHING STRENGTHS:

TEMPERATURE	OLD 84	NEW 84
300° F.	1500 psi	9000 psi
480° F.	1740 psi	8500 psi
840° F.	1395 psi	9030 psi
1200° F.	1925 psi	10050 psi
1560° F.	1700 psi	10750 psi

KAISER REFRACTORIES

ACT APPLICATION CONSULTING TEAM: created to achieve greater refractories economy and efficiency. Ask for free booklet.

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PITTSBURGH 22, PA. . . . . 3 Gateway Center

setting spindle mounted on the base. Transverse and longitudinal slide adjustments are provided. The presetting spindle is equipped with a combination No. 50 NMTB and No. 50 Flash-Change taper, as well as a handwheel for manual rotation.

The two co-ordinate positioning slide elements consist of a saddle mounted on dovetail and flat ways, with longitudinal movement parallel to the spindle axis, and a transverse slide member moving on cylindrical guide ways normal to the spindle axis. They read directly to 0.0001 in. without interpolation.

A Vernac instrument, mounted on the transverse slide, provides for control of diameter settings. Another, mounted on the longitudinal slide, provides for setting length or depth. A Bausch & Lomb, 40 power, illuminated microscope has a special cross hair reticule for optical sighting of the tool point.

For further information, *write* Microbore Div., DeVlieg Machine Co., Royal Oak, Mich.

Silicon Power Supplies Offered in Three Groups

SILICON, direct current power supplies in ratings from 0.75 to 75 kw are divided into three basic industrial rectifier groups—general purpose, essential service, and synchronous motor field excitation units.

Visual checks and occasional cleaning of the internal assembly are about all the maintenance required. The units are convection cooled. Current limiting fuses protect the silicon cells against faults on the load and source side of the equipment.

Operating efficiency is nearly constant at 96 per cent from 1/4 to full load for units rated 25 kw and higher. Below 25 kw, efficiency decreases gradually to about 95 per cent. You can get 13 separate kw ratings in both wall and floor mounted enclosures. General purpose units feature a dynamic braking panel (as an accessory) to safely dissipate regeneration caused by reversing actions of elevator or crane motors.

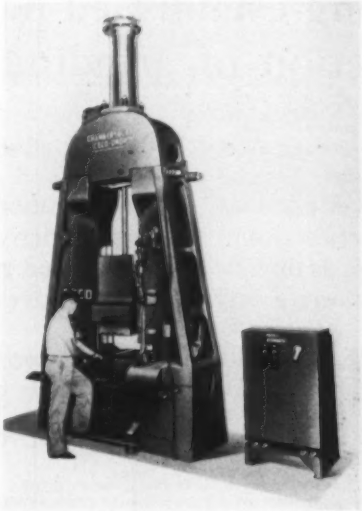
For further information, *write* Low Voltage Switchgear Dept., General Electric Co., 6901 Elmwood Ave., Philadelphia, Pa.

Improved Drop Hammer More Economical, Safer

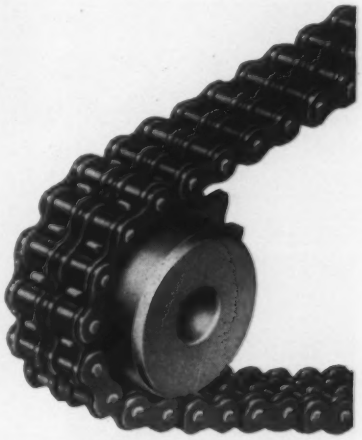
EASIER, safer, and more economical operation are some of the benefits of the improved Ceco-Drop, gravity drop hammer. Boards, rollers, pulleys, belts, motors, and gears have been eliminated.

A die setting control makes die changes easier, quicker, and safer. The ram can be inched up or down without fear of a power blow.

A faster acting, nonslip rod clamp gives instant reaction to the release of the operator's foot from the treadle. The positive clamping action results in uniform forging



A Morse answer



roller chain

...when the problem involves service life and performance

Superior fatigue resistance

Increased horsepower ratings

Statistical hardness control

Electronically controlled pitch

All parts automatically inspected

Drive-design service

Distributor-stocked

Got a chain problem? Call your Morse distributor. He's listed in the Yellow Pages.

MORSE

A BORG-WARNER INDUSTRY

BW

Morse Chain Co., Dept. 2-61, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

Why let long-established habit dictate your selection of grinding wheels?

Sure, the grinding wheels you've always used may be doing the job, *BUT . . . is that job good enough* in today's cost squeeze? Let Simonds help *you* update *your* grinding practices. Complete line, available through Simonds distributors, includes wheels of all abrasives and bonds, all sizes and shapes . . . all industrially-renowned products, in efficiency-proved specifications . . . and backed by our 60 year reputation as a top-rank producer of abrasive grain and grinding wheels. Send for complete descriptive catalog.

SIMONDS ABRASIVE CO.

PHILADELPHIA 37, PENNA.
DIVISION OF SIMONDS SAW AND STEEL CO.

your "buy-words" for better grinding
CALL YOUR SIMONDS DISTRIBUTOR
helping YOUR business is HIS business

WEST COAST PLANT: EL MONTE, CALIF. — BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

blows and more continuous operation, says the company.

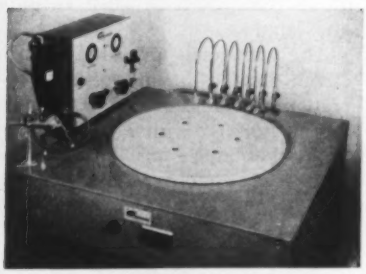
The knockoff dogs are now equipped with nylon tips, reducing shock to valve control rigging and wear on the ram incline. The tips are replaceable. The program controller is available for converting any Ceco-Drop into a semiautomatic forging installation, the company adds.

For further information, *write* Chambersburg Engineering Co., Chambersburg, Pa.

Indexing, Rotary Tables Speed Soldering Work

STANDARD rotary tables and indexing tables completely mounted and tooled—less fixtures—are available for making soldering and brazing operations automatic or semiautomatic using the Fusion paste method.

The tables are ready for automatic soldering or brazing except for fixtures to hold the parts and the method of loading parts onto the table. Tables can hold 200 lb of parts.



The machines are complete with Fusion paste applicator, natural gas and air burners, and motor driven or air operated tables with a 2 ft diameter ceramic table top.

For further information, *write* Fusion Engineering, 17921 Roseland Ave., Cleveland 12, Ohio.

Sleeve Bearings Good For Extreme Conditions

SELF-ALIGNING, self-lubricating Flex-Block sleeve bearings (flanged and pillow block types) are designed to solve many difficult bearing problems. They can operate in temperatures up to 1000° F, in corrosive and contaminating conditions, in inaccessible locations where lubrication and maintenance are problems, where noise control is important, at slow speeds, and even under water.

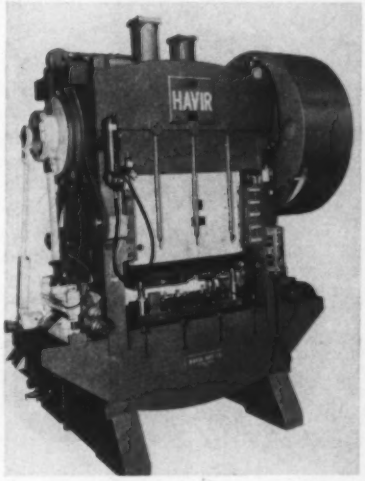
The company says the construction almost doubles normal sleeve bearing life. The sleeve bearing cartridge is held in position in the housing by a setscrew. When backed off, the screw allows the cartridge to be rotated 180 degrees, to add longer life from the opposite side of the bearing. The cartridge can be rotated without removing the bearing from the shaft.

For further information, *write* Dept. PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

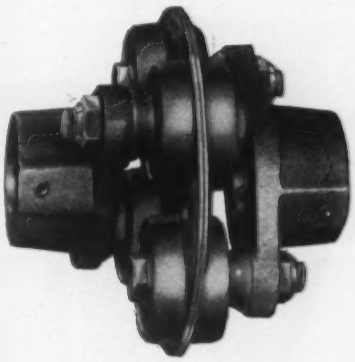
Die, Press Life Stressed On 150 Ton Automatic Unit

INCREASED press and die life are two features of the heavy duty, 150 ton Havir Auto-Press. The high speed, automatic unit has a cylindrical type ram for precision alignment of die and ram with maximum ram rigidity.

The company says the cylindrical type ram has maximum guiding surface to insure proper guiding of ram, punch, and die. Use of tapered wedges behind the ram bearings allows takeup. Prior to installation in the press, the ram and bearing are carefully hand lapped to help assure perfect mat-



A Morse answer



Morflex couplings

...when the problem involves vibration and misalignment

Isolate vibration
Cushion shock
Absorb misalignment
Torsionally flexible
Impervious to water, dirt, oil
Arrest electrolysis
Distributor-stocked

Got a coupling problem? Call your Morse distributor. He's listed in the Yellow Pages.

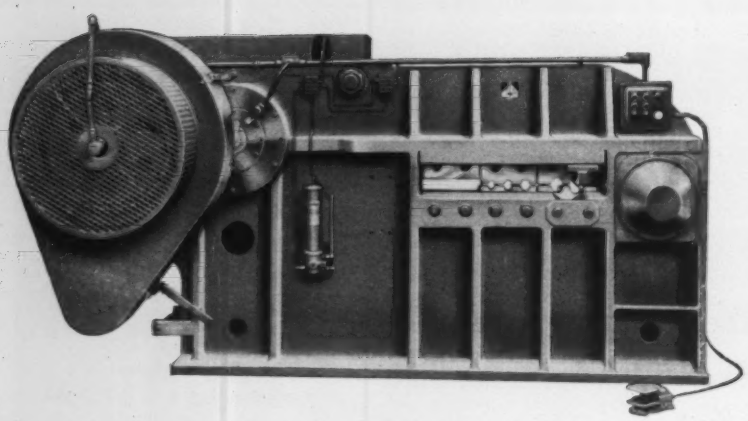
MORSE
A BORG WARNER INDUSTRY
BW

Morse Chain Co., Dept. 2-61, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

popular size

HILL ACME Bar-Billet Shear

cuts rounds, squares and flats without knife change



simple, rugged design

The Model 500 HILL ACME Bar-Billet shear has cutting capacity of 4½" in rounds or 4" in square mild steel. The basic principle of lever and fulcrum is employed for maximum efficiency with low power input.

versatile

With free running speed of 35 cuts per minute, high production is assured. The 36" knife permits cutting of rounds, flats, etc. without knife change. All models are available with fully automatic, semi-automatic or hand feed.

size range

HILL ACME Bar-Billet shears are made in a range of sizes to efficiently accommodate every commercial requirement. Bulletin BB-61 gives complete details.

The HILL ACME Company

Also Manufacturers of:

"CANTON" ALLIGATOR SHEARS • "HILL" HYDRAULIC SURFACE GRINDERS • "ACME" FORGING MACHINES • "CLEVELAND" KNIVES • MECHANICAL LIFTERS • "KLING" METAL WORKING MACHINERY

1201 WEST 65th ST., CLEVELAND 2, O.

NEW PRODUCTS and equipment

ing, Havir says. Another die safeguard is the automatic shutoff. The press stops automatically in the event of a die jam or misfeeding.

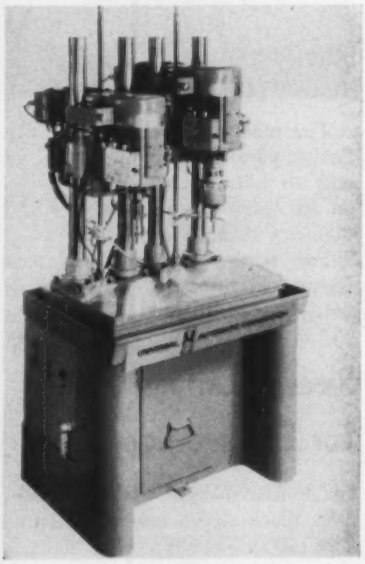
Standard operational speeds are 70 to 210 strokes per minute using an 18 in. wide feed. Slower speeds can be ordered. Air clamped feeds prevent stock distortion and allow infinite variations of roller pressure. Single or double feeds are optional. Shock mounts are built in. They allow press operation on any reinforced concrete floor without using special floating blocks or shock pits. A variable speed, 20 hp motor is used.

For further information, *write* Havir Mfg. Co., 444 N. Cleveland Ave., St. Paul, Minn.

Two Spindle Unit Does Secondary Operations

A TWO spindle, vertical machine for secondary operations has completely self-contained heads. They may be independently adjusted (0 to 24 in. spindle nose to table) to eliminate the need for riser blocks of different heights when drilling and tapping.

The completely prewired control circuit provides for independent operation of the heads and easy interlocking for use with automatic fix-



Charles Saenger, Chief Metallurgist for the Illinois Tool Works in Chicago, Illinois.

CHARLES SAENGER tells how Lindberg equipment produced better cutters and hobs

QUOTE

"Unground form cutters and hobs require certain refinements above and beyond those needed for ground tools. Our Lindberg-Upton salt-bath units and daily chemical control of the salt-bath solutions help us maintain an excellent surface condition and hold to critical dimensional tolerances and close hardness range required by these tools. We are very well pleased with the consistent, trouble-free service our Lindberg-Upton furnaces have provided month in and month out."

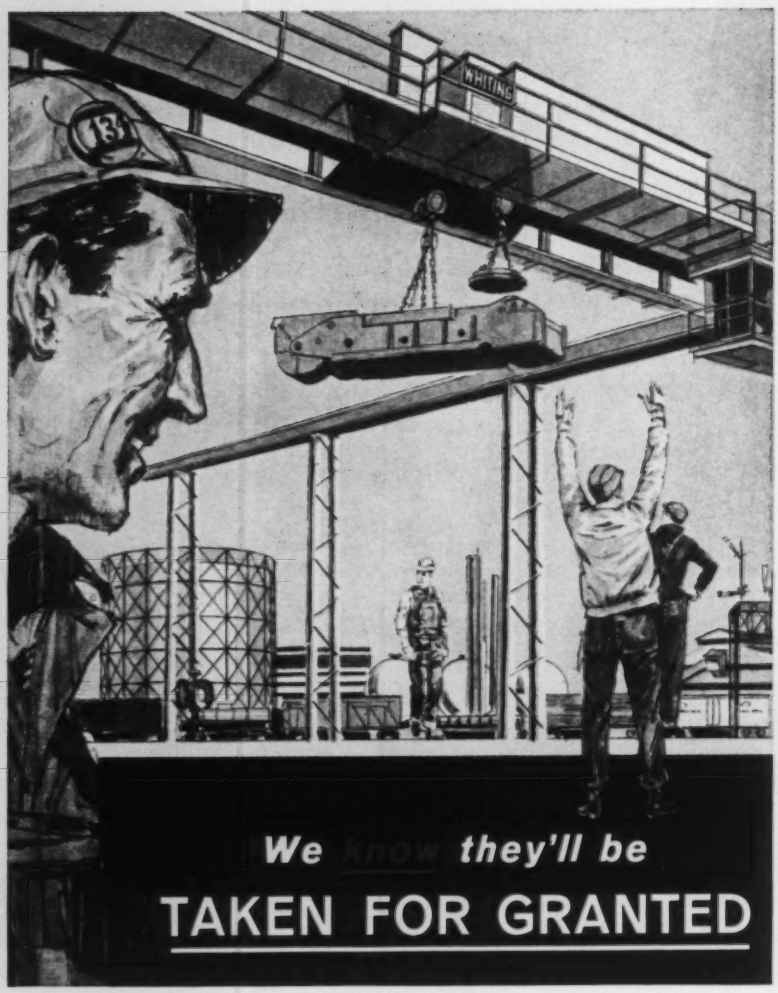
The success of Illinois Tool Works in producing their top-quality unground form cutters and gear hobs is a well-established fact. The banks of Lindberg-Upton furnaces in their plant provide quality control in high speed steel hardening through the ability to hold rigidly the desired temperature and also assure proper salt conditions at all times.

The solution to any salt-bath furnace requirement is easy to find. Just look to Lindberg, and the complete line of Lindberg-Upton high and low temperature furnaces for every production process where salt-bath equipment is needed. For complete information just call the nearest Lindberg representative (he's listed in your classified phone book) or, if you prefer, write us direct. Salt Bath Furnace Division, Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, Spain, Switzerland and West Germany.

LINDBERG
heat for industry

One of the Lindberg-Upton Salt Bath Furnaces at Illinois Tool Works



As anyone can tell you, people (especially wife-type people) dislike being taken for granted.

Yet in a busy manufacturing plant, production schedules depend on the taken-for-granted reliability of all equipment (but especially materials handling equipment).

Whiting materials handling systems are the result of years of engineering improvements and refinements. A crane, like the one above, is thoughtfully engineered and carefully constructed so that its unobtrusive dependability can be taken for granted day in and year out.

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For further information, *write* Universal-Automatic Corp., 9545 Ainslie St., Schiller Park, Ill.

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IMPROVED performance, quality, and design are the results of 40 specification changes in the narrow aisle, electric Reach Fork truck.

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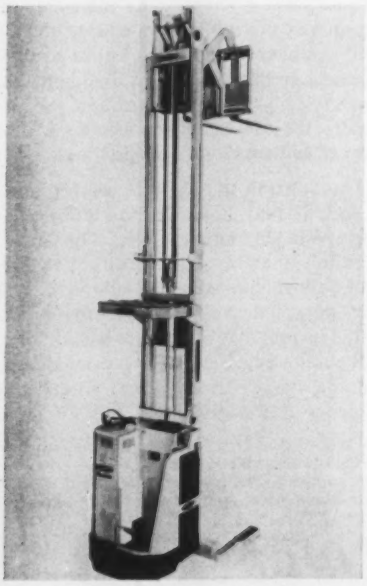
The carriage is 12 in. lower to allow ceiling high stacking and 1½ in. shorter for easier narrow aisle operation. The compact mast and



carriage section reduces the dead weight of the elevating mechanism and improves battery performance.

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For further information, *write* Raymond Corp., 91-188 Madison St., Greene, N. Y.

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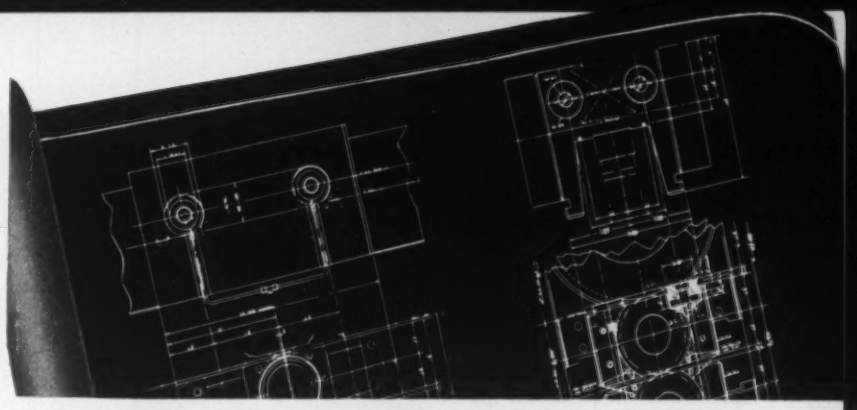
For further information, *write* Dodge Mfg. Corp., Mishawaka, Ind.



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  New concept of coil processing and scale breaking

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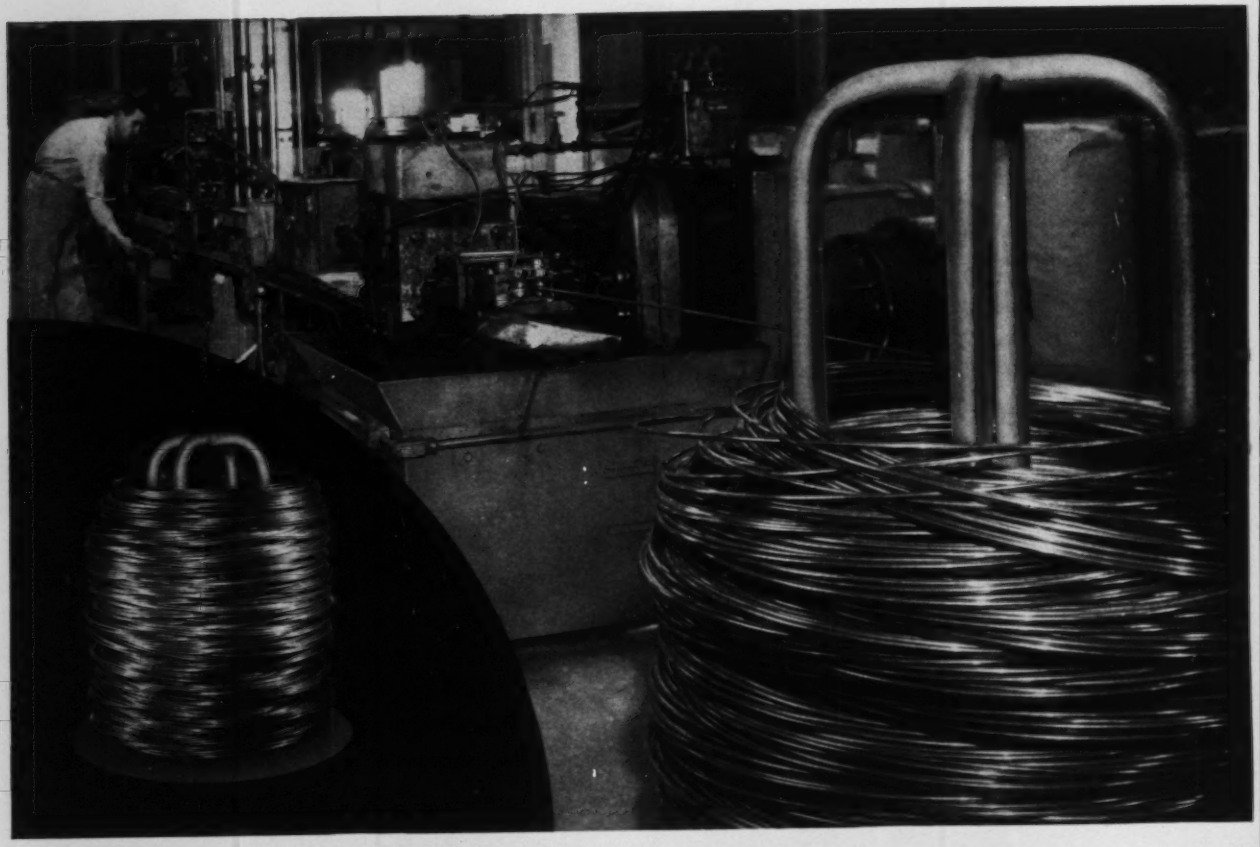

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Here's the experience of one typical user:

> "When we used small coils, we lost several feet every time we changed a coil. Now, using CF&I Spiders, we have cut our waste 80%. We've also improved the quality of our end product because we don't have to reset the machine. CF&I Spiders have reduced our handling and storage problems, too, because you've got a lot of wire in one easy-to-handle package."

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NEW literature

Write directly to the company for a copy

Heat Processing Furnaces

Bulletin GER-1751 is a four page publication explaining how to prepare an economic study on heat processing furnaces. Text includes sections on where to obtain data, how to make the study, items to consider, and three typical examples. General Electric Co., Schenectady 5, N. Y.

Cobalt-Nickel Coatings

"Bibliography on Cobalt-Nickel Coatings" (25 pages) contains 135 references to the world's literature from 1899 to 1961. Abstracts accompany references from 1956 to 1961. The 25 page companion, "Bibliography on Cobalt-Nickel Alloy Properties," lists 155 references covering literature from 1927 to 1961. Abstracts are included from 1955 to the present. Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

Cladding Technique

A reprint, "New Techniques for Cladding with the Gas-Shielded Process," includes a discussion of a method for overlaying dissimilar materials with more precise control of weld metal dilution and quality. The process is being used in cladding nuclear reactor shells. Specify form ADR 132. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Precious Metal Catalysts

Precious metal catalysts used in hydrogenation reactions are described in a data file. It details catalysts of platinum, palladium, rhodium, ruthenium, and outlines guides in selecting catalysts and carriers for specific applications in the chemical, petrochemical, and pharmaceutical industries. Ask for "Precision Metal Catalysts." Technical Service Dept., Englehard Industries Inc., 75 Austin St., Newark 2, N. J.

Safety Marking Colors

"Colors and Methods" shows samples of the six generally accepted safety marking colors and explores in detail their application to the hazards most frequently encountered in industrial plants. Paint as a housekeeping aid is also discussed. Industrial Maintenance Div., Sherwin-Williams Co., Cleveland 1, Ohio.

Copper-Lithium Alloys

Articles on the copper-lithium system are described in an annotated bibliography. The company says the abstracts cover all the published literature on the subject. They're arranged in chronological order. An index provides reference to subjects such as physical and chemical properties, uses, analysis, preparation, and the standard phase diagram. Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.

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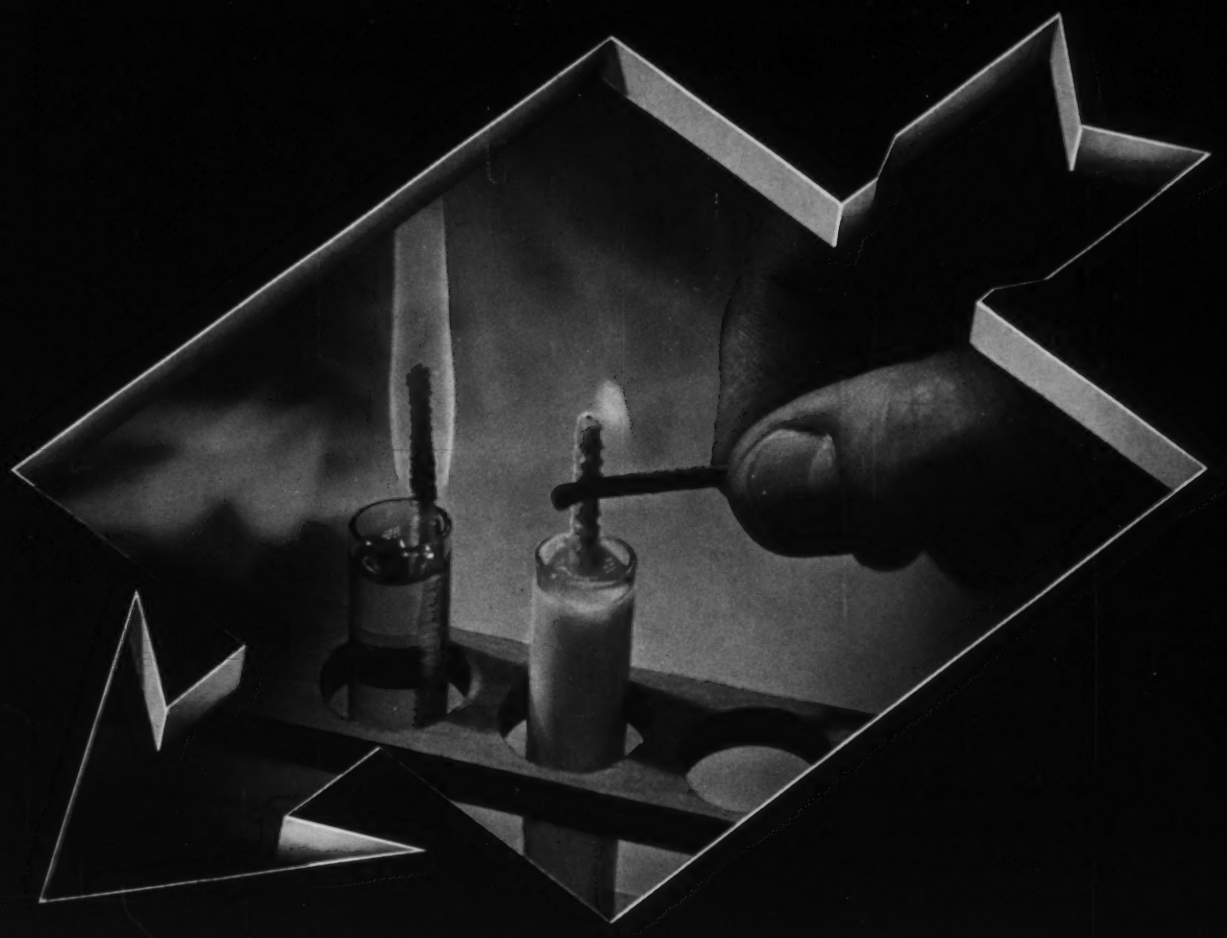

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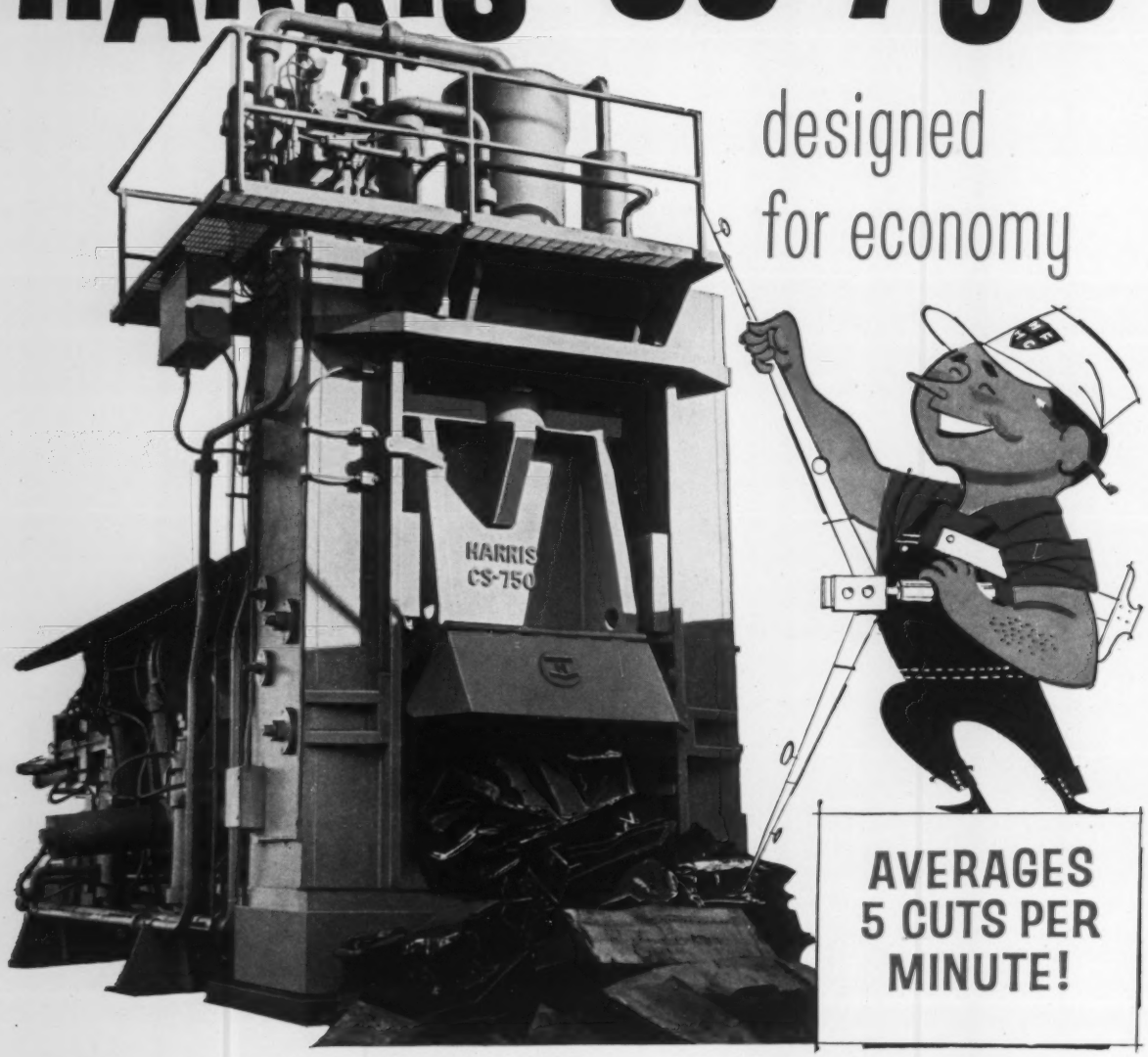

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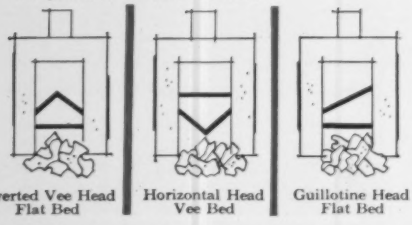

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Steel's Summer Dip May Be Shallow

ALTHOUGH the vacation slowdown in metalworking is in the offing, steelmen think ingot production may fare a little better this summer than it has in recent years. They reason: 1. Stocks of consumers are so depleted they'll have to maintain intake at a fairly respectable level right along, especially if mill deliveries show signs of lengthening. 2. Automotive requirements this month may prove to be heavier than recently anticipated.

AUTOS HOLD KEY—What happens in the automobile industry the next few weeks will exert tremendous influence on third quarter steel output (traditionally poor). About as many cars may be assembled in June as in May (more than 500,000). While that pace will probably slacken in July (when 1961 model runs begin to taper), production may not be cut too much too quickly—particularly if active retail demand continues.

NEGOTIATIONS LOOM—With Big Three wage agreements expiring Aug. 31, new labor contract parleys open June 28 at General Motors, June 29 at Ford, and June 30 at Chrysler. Peaceful settlements are expected as of now, with the union possibly winning a package increase of 8 to 10 cents an hour in a two year contract.

Until the matter is disposed of, it will be only prudent for the automakers to maintain large finished car stocks in case the negotiations misfire and a strike results.

COMEBACK ENCOURAGING—Steelmen think their industry's recovery since last March is solid, with ingot operations currently hovering above the 71 per cent of capacity mark (based on 1960 ratings) compared with around 55 in March. While demand is now leveling off (the rate of order increase has slowed) and some easing in production can be expected from now through August, sentiment for the longer term is strengthening.

PRICE SQUEEZE—No early easing in the steel price bind is sighted. The Bureau of Labor Statistics' steel price index last week fell to 185.6, the lowest since August, 1958. Steelmen say prices must eventually rise, but they won't hazard a guess as to when, or how much. Steel wage costs have risen over 40 cents an hour since mid-1958, and another 12-cent-an-hour boost is scheduled for Oct. 1. The last general price hike ($4.50 a ton) was in 1958. There have been a few product price revisions since, mostly on the downside. The most recent involved an $18 a ton reduction on certain types and sizes of seamless black line pipe, effective June 5. Oil country steel pipe prices to jobbers were also cut recently through an increase of 4 per cent in standard discounts. Still another recent reduction involved cuts of 1½ to 4 cents a pound on certain grades of stainless cold rolled strip.

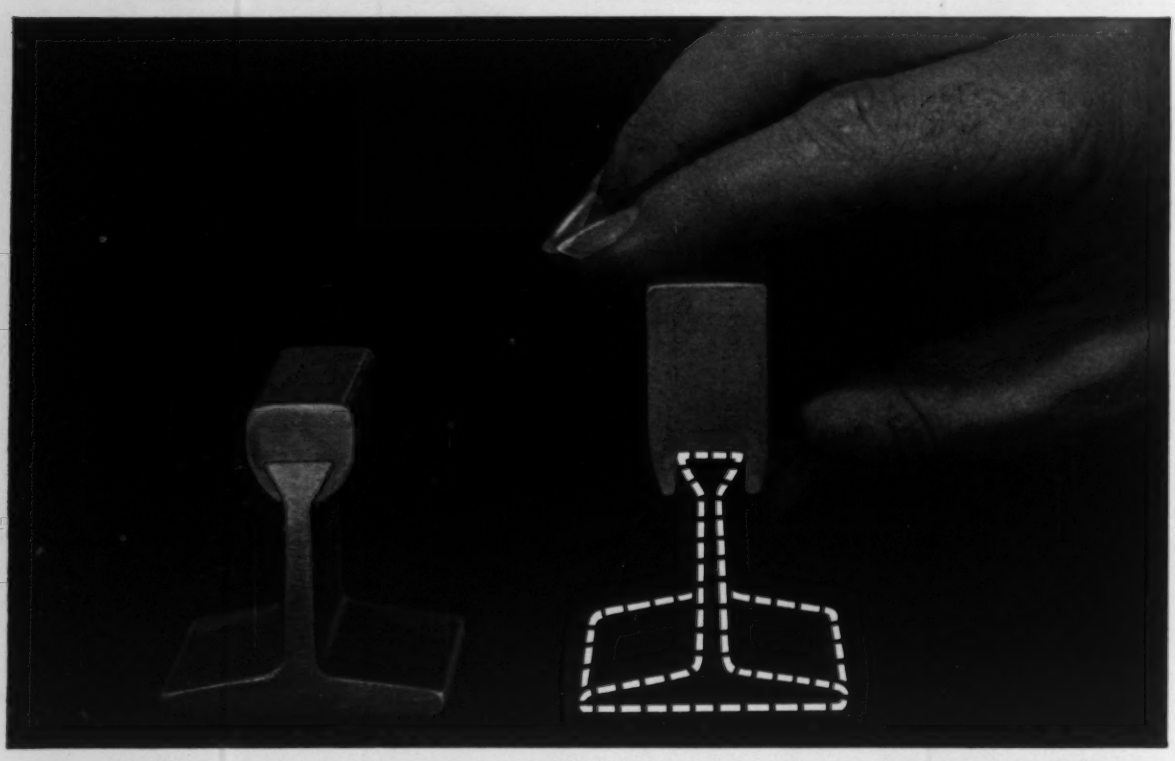
DIM PROSPECT—Most marketmen think significant upward price adjustments are unlikely so long as supply outstrips demand. Competition with other materials also weighs heavily against a broad rise. On top of that, government opposition to higher prices is a factor working against any general advance. It was reported in Washington last week that the administration will seek to discourage any contemplated increase at this time.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	197	205
Reinforcing	...	206
Boiler Tubes	...	208
Canada	199	213
Charts:		
Finished Steel	...	203
Ingot Rate	202	...
Scrap Prices	...	217
Clad Steel	...	211
Coal Chemicals	...	213
Coke	...	213
Comparisons	...	203
Contracts Placed	201	...
Contracts Pend.	201	...
Electrodes	...	*
Fasteners	...	208
Ferroalloys	198	214
Fluorspar	...	213
Footnotes	...	208
Imported Steel	197	213
Ingot Production	202	...
Metal Powder	...	213
Nonferrous Met.	220	222
Ores	199	213
Pig Iron	199	212
Piling	...	205
Plates	197	205
Plating Material	...	223
Prestressed Strand	...	208
Price Indexes	...	203
Producers' Key	206	...
R.R. Materials	...	208
Refractories	...	213
Scrap	216	218
Semifinished	...	205
Service Centers	196	212
Sheets	196	206
Silicon Steel	...	207
Stainless Steel	198	211
Strip	196	207
Structurals	201	205
Tin Mill Prod.	...	207
Tool Steel	...	211
Tubular Goods	197	211
Wire	198	207

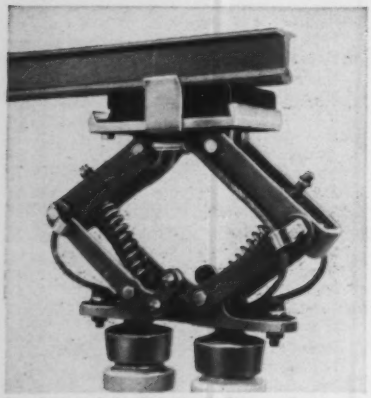
*Current prices were published in the June 5 issue and will appear in subsequent issues.

COPPER FOR CONDUCTIVITY TEAMS UP WITH STEEL FOR STRENGTH



...in a compact, low-maintenance conductor system for heavy-current industrial applications

The copper-headed steel conductor rails, shown above, of the Ringsdorff Carbon Corp., East McKeesport, Pa., help provide many economies in conductor systems for such heavy-current users as traveling cranes, ore bridges, monorails—using either a-c or d-c.



The heart of the Ringsdorff Current Conductor System—the copper-headed steel conductor rail and pantograph current collector with a graphite carbon shoe. Components, including rail hangers and joints, are available in a wide variety of sizes, with capacities up to 2000 amps, for either a-c or d-c systems

The system is simple and compact. One basic steel shape provides strength and simplifies installation. Over it is cold drawn the copper head of extruded Anaconda ETP Copper-100, in the size to meet individual current requirements. (Copper-headed conductor rail, left, 500 amps; right, 1500 amps.) Less space is needed; installation is easier than with aluminum rails.

Long life and low maintenance. The special Ringsdorff carbon graphite used in sliding contacts has an affinity to copper, putting down a film that lubricates its passage and protects the rails. Wear on the copper head is negligible over periods of 20 to 25 years. Only maintenance is replacement of carbon shoes, having an average life up to 3 years. Aluminum rails must be protected by lubrication or they will wear and pit—when out of use for a period may develop an insulating oxide film.

This is another illustration of the way the unique properties of copper are being utilized in industry to do things better—at lower cost. Anaconda has teams of specialists available to sit down with members of your organization to help select the alloys and forms of metal to solve your value analysis problems. For such technical help, see your Anaconda representative, or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 6147

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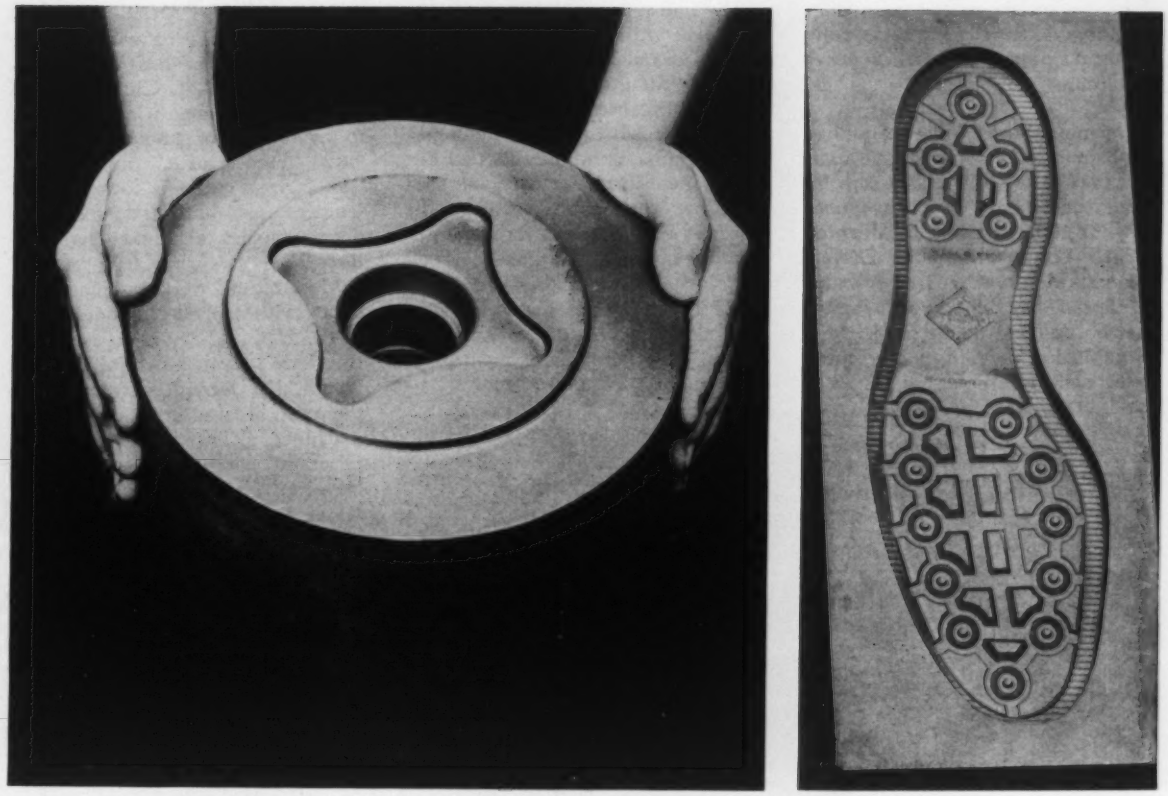

PRECISION CAST TOOL STEELS—forging die insert (left) and mold for rubber shoe sole—were made by the Shaw process. The forging die insert is hot work tool steel and will be used in the as-cast condition for automotive parts. The sole mold is air hardening tool steel

Precision Cast Tool Steels Catch On

PRECISION CASTING may soon take tool steels out of Tiffany's and into the A&P.

Big markets are opening up as tool steel producers and diemakers adopt ceramic molding processes that produce castings of superior quality—better surface finish and closely controlled contours and dimensions.

Although the cast-to-size products cost more initially than the wrought tools they replace, they often save money in the long run. Users profit by saving time, eliminating a lot of machining, and getting longer die life. Examples:

• Cast Masters Inc., Racine, Wis., says precision casting of extrusion die bridges reduces labor costs involved in finishing such tools by 40 per cent. What's more, casting life exceeds that of the wrought product by 100 per cent.

• Sarcol Foundry & Pattern Corp., Chicago, says ceramic molding extends the life of permanent iron molds for casting aluminum by at least 25 per cent, shortens delivery times by as much as 60 per cent (vs. machined molds), and often reduces costs by 50 per cent.

• **Major Markets** — Precision cast tool steels are being used for foundry patterns and coreboxes, diecasting and permanent mold dies, drop forging and press forging dies, extrusion dies, plastic injection and compression molds, rubber molds, glass molds, stamping and forming dies, hobs, and a wide variety of miscellaneous tools, dies, and cutters.

Despite their higher material cost, cast tool steels are competing for a share of the rubber mold market. The cast tool steel molds don't require hand fitting and a lot of finish machining. They're said to excel because their edges don't break down and allow molten metal to escape at the parting line.

• **Invading New Fields**—Foundry patterns and coreboxes are being cast to size in tool steels such as H-13 and high carbon, high chromium types. Molds for glass and glass fibers, are also going the tool steel route—at least experimentally. The old methods and materials aren't being abandoned, but they're being systematically re-evaluated.

Even cutting tools, such as broaches and slab milling cutters, are being cast to size. Their performance is said to be good in applications where the main problem is abrasion resistance rather than impact. Impact properties are satisfactory for tools that have more

than one tooth engaged at a time, but those with staggered teeth don't withstand impact too well at heavy feed rates.

• **Japanese Show Way**—Although U. S. automakers have used some precision cast tool steels in dies for small components, they have been slow to adopt ceramic molding on a large scale. Oldsmobile Div. of General Motors Corp. is probably the leader. STEEL's sources estimate that 60 per cent of the forging dies being used at the Oldsmobile foundry in Lansing, Mich., are cast. The really impressive work is being done in Japan with body dies, which no U. S. automakers have attempted to cast. Results—in terms of time saved—have been phenomenal.

The record time for tooling a U. S. car is about 21 months. But a Japanese firm, Toyokogyo, used precision castings to tool up the Mazda R-360 coupe in three months (from blueprints, not models). Tooling included more than 200 body dies, 15 aluminum diecasting dies, 100 shell mold patterns and core-boxes, 150 permanent mold dies, plus rubber and plastic molds.

• **Bigger Markets Ahead**—"We feel that precision casting will make its greatest strides in hot work applications," says R. J. Christensen, of Cast Masters Inc. "Castings seem to have superior properties at elevated temperatures," he explains. "Their yield point is lower at low temperatures, but it doesn't drop off as rapidly at higher temperatures."

Most of the work is being done today with tool steel grades H-11, H-12, H-13, H-21, D-2, and D-5. But there's a vast potential for other grades that haven't been made in the past because they couldn't be machined. "There are many applications where tool steels would be clearly superior from a functional standpoint," says Irwin Lubalin, general manager, Shaw Process Development Corp., Port Washington, N. Y. "We're approaching the day when people won't have to think about anything but function. If it's heat or abrasion resistance they want, they'll specify high vanadium, high cobalt, cobalt chrome, or high tungsten alloys. So what if they can't be machined? They'll be cast to size."

Sheets, Strip . . .

Sheet & Strip Prices, Pages 206 & 207

The light, flat rolled steel products (including tin plate) continue in most active demand of all the major products. Buying is being sustained by a diversity of orders—for shipping containers, tubing and conduit, office furniture, shelving and cabinets, stoves, refrigeration equipment, and other light durables. Auto demand is only fairly active, and is less pressing than it was in recent weeks. The distributors are ordering a little more freely.

Distributors . . .

Prices, Page 212

Sales of steel by service centers are likely to be larger in June than they were in May. The forecast is based on an increase in the number of purchasers rather than increased tonnages placed by them.

A strong comeback in August, following a dip in July, is expected. Bookings by distributors this year may range up to 10 per cent better than they were in 1960.

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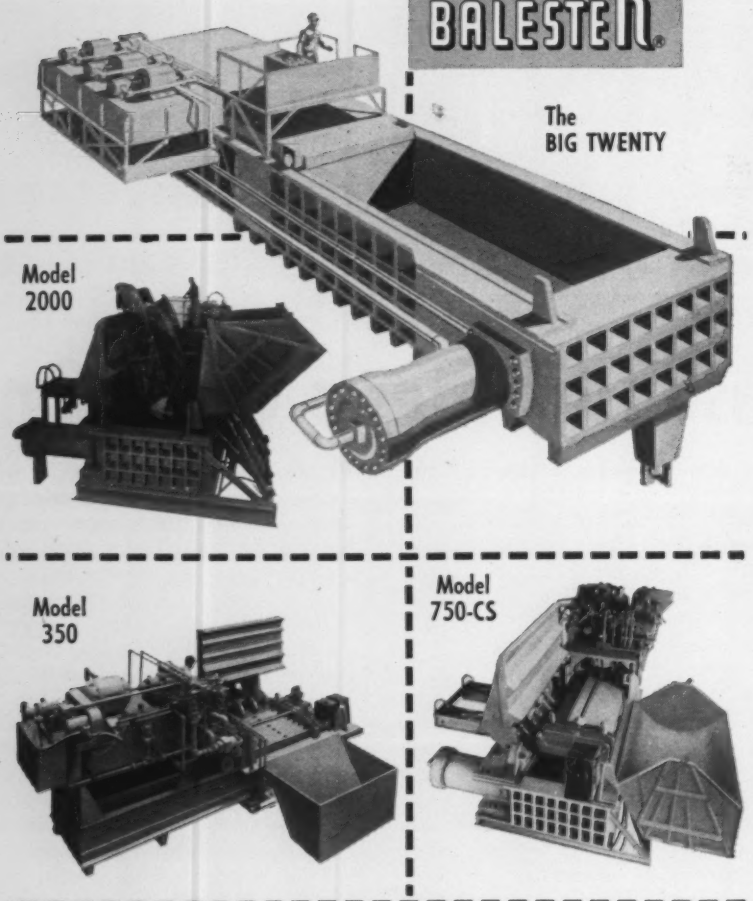

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West Coast Steel Imports Rise Noticeably in March

Steel imports at Los Angeles in March totaled 21,835 tons, up 6000 from the preceding month, reports the West Coast Metal Importers' Association. The February tonnage set a three year low, says Albert Perrish, association president, pointing out that the March increase brings the import movement to normal levels.

"We anticipate that imports will now remain constant at about this monthly (March) figure, and that we have passed the bottom of an adverse cycle," he said.

The value of steel imports to Los Angeles in March was estimated at $4 million, which compares with $6 million in the same month of 1960 when 36,500 tons came in. Los Angeles held third place ranking among steel importing customs districts in March, being exceeded only by Galveston and New York. Total imports on the West Coast rose to 39,300 tons in the month, up 12,000 from the preceding month. Those figures include tonnage imported at San Francisco (8400), San Diego (1720), Oregon (4100), and Washington (3300).

Steel Bars . . .

Bar Prices, Page 205

Hot rolled carbon bar business is spotty, and in some areas (such as New York), domestic sellers are facing increasing competition from abroad. That's true in both commercial bars and reinforcing steel.

Consumption generally is a little better, and this is being reflected in a slight pickup in ordering.

Tubular Goods . . .

Tubular Goods Prices, Page 211

Despite reported seasonal gains in demand for tubular goods, some price easiness has developed in the market.

National Tube Div., Pittsburgh, U. S. Steel Corp., lowered prices $18 a ton (9 points higher discount) on seamless black line pipe in API grade X-52 and only in 6⅝ through 12¾ in. OD inclusive, double random length. The lower prices apply to minimum carload quantities of each diameter and wall thickness ordered. The new prices, which became effective June 5, were made to meet competitive conditions in the transmission pipeline market.

Prices to jobbers on oil country steel pipe also were reduced recently about 4 per cent, through increases in the standard discounts.

Plates . . .

Plate Prices, Page 205

Platemakers expected that their market would be given a lift the next week or so by Navy work, but bids have been deferred until late June and early July. It's thought the Navy tonnage for third quarter will top that in the second quarter by 5 per cent, possibly slightly more in the case of high tensile, low alloy material.

The railroads are buying little tonnage, and the general run of tank and boiler work continues spotty. Chemical industry needs are holding up, and there's a good assortment of alloy plate work developing.

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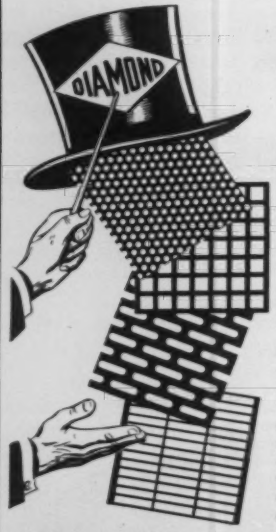

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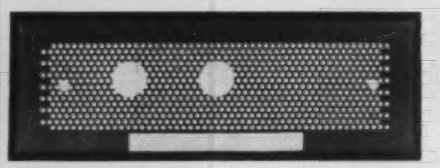

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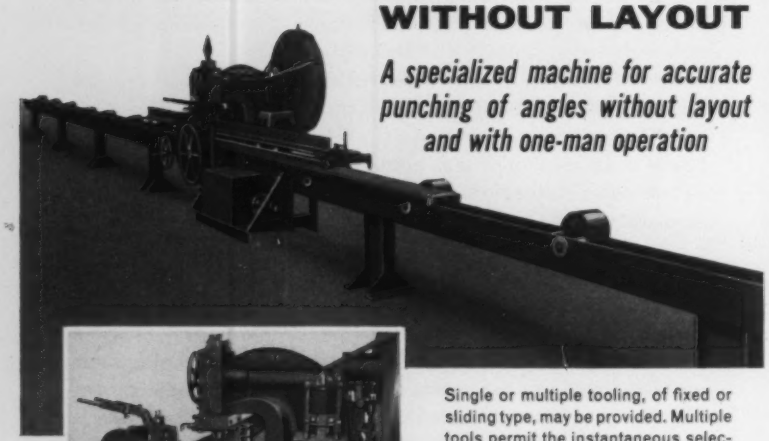

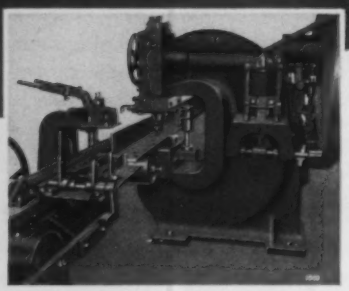

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Controls for spacing, punching and unloading are centralized for one-man operation.

Write for Bulletin 313A

The trend is to Thomas

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69

Ferroalloys . . .

Ferroalloy Prices, Page 214

Prices on molybdenum products have been advanced about 10 per cent by Climax Molybdenum Co., division of American Metal Climax Inc., New York. Factors behind the increase: Higher wage costs, increased prices for services and supplies, and the cost of future expansion programs. The new and old prices per pound are:

	Old	New
Molybdenite concentrate	$1.25	$1.40
Molybdic oxide, canned	1.47	1.60
Ferromolybdenum	1.76	1.89

Shipments of concentrate in the U. S. during the first two months of this year were 9.9 million lb, an indicated annual rate of 59.4 million lb. Last year, shipments totaled 70 million lb. Supplies are considered light in relation to world consumption, and Climax is pushing an expansion program designed to increase production.

Wire . . .

Wire Prices, Pages 207 & 208

Manufacturers' wire is moving a little faster than it was, but deliveries are unchanged at one to five weeks, depending upon processing. Business in merchant wire remains slow, and items are readily available from stocks. High carbon specialties appear to be in more active demand; one Eastern mill is operating at 70 per cent of capacity.

Stainless Steel . . .

Stainless Steel Prices, Page 211

Several producers have followed the lead of Allegheny Ludlum Steel Corp., Pittsburgh, and reduced prices on various grades of cold rolled stainless strip 1½ to 4 cents a pound. It's expected that producers who haven't taken formal action will meet quoted prices in competition.

Armco Steel Corp., Middletown, Ohio, announced it was lowering its base prices on 12 types of cold rolled, stainless strip as well as some dimensional extras.

Armco reduced gage and width extras on its standard quality sheets in widths 48 in. and under by ½ to 3¼ cents per pound, depending on width and gage. The change in sheets went into effect June 5. The company dated its reduction on strip as of June 1. Allegheny Ludlum

and Republic dated their strip reductions as of May 29.

Canadian Steel Output Hits New Peak for May

Helped by continuing improvement in the general economy and orders for steel for natural gas pipelines, Canadian steel ingot production in May totaled about 535,000 tons, a record, and an increase of some 50,000 tons, or 10 per cent, over the previous peak for May, 488,523 tons, set in 1960.

Cumulative production in the first five months is estimated at 2,550,000 tons, only about 125,000 (5 per cent) below the total reported for the like period last year.

Pig Iron . . .

Pig Iron Prices, Page 212

Sellers of merchant pig iron report a decline in orders and look for a further drop as the vacation season draws near. Export demand continues to be a bright spot in the market. Iron is moving in fairly sizable volume via the Barge Canal, the Great Lakes, and the St. Lawrence Seaway into export markets.

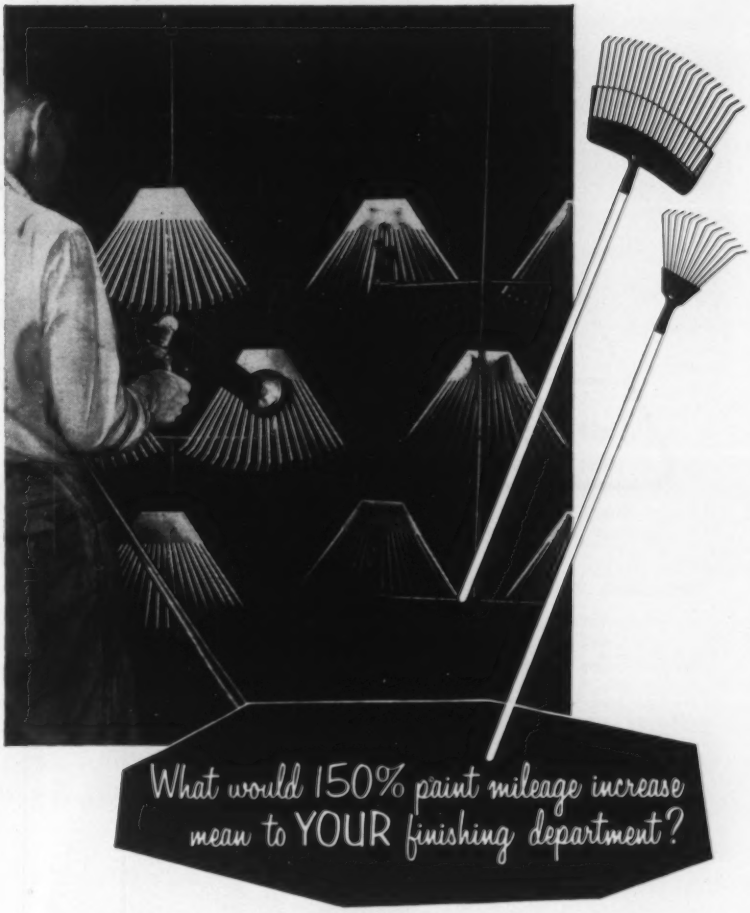
Iron ore . . .

Iron Ore Prices, Page 213

Stocks of iron ore in the U. S. and Canada as of Apr. 30 totaled 59,737,971 gross tons vs. 38,526,010 on the same date in 1960, reports the American Iron Ore Association, Cleveland. Of the total, 30,844,198 tons were U. S. Lake Superior ores, 3,311,244 other U. S. ores, 1,525,955 Canadian Lake Superior ores, 4,372,729 other Canadian ores, and 19,683,845 tons of other foreign ores.

Consumption in April amounted to 7,705,096 tons (U. S. and Canada), bringing the total for the first four months of the year to 28,479,093 tons. Use in April, 1960, was 11,029,520 tons, while consumption in the first four months was 47,755,311 tons.

Lake Superior iron ore shipments (U. S. and Canada) in May totaled 5,236,532 gross tons, down 7,238,669 tons from the 12,475,201 tons moved in May, 1960, reports the



To Keller Manufacturing Co., Inc., it means a savings of nearly $50 a day in finishing costs on leaf rakes. And, theirs is a comparatively small plant operation.

Before moving into their new plant, this St. Louis manufacturer of Sweep-Easy lawn and garden tools investigated and tried out various finishing equipment. They chose Ransburg No. 2 Process to do the job because they found that only the Ransburg Electrostatic Hand Gun could give them the desirable increase in production—with improved quality—and at lower cost.

PRODUCTION IS NEARLY DOUBLED
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With the Ransburg Hand Gun, Keller's daily painting prodution of leaf rakes nearly doubled what they were formerly getting with air hand spray. And, where they used to get only 168 rakes per gallon of paint, they now get 426 per gallon—over 2½ times as many—actually *an increase of over* 150% *in paint mileage.* With the unique "wrap-around" feature, electrostatic is improving the quality, providing a complete, uniform coating over all areas—even on the tine edges.

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See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochure which shows numerous examples of modern production painting in both large and small plants.

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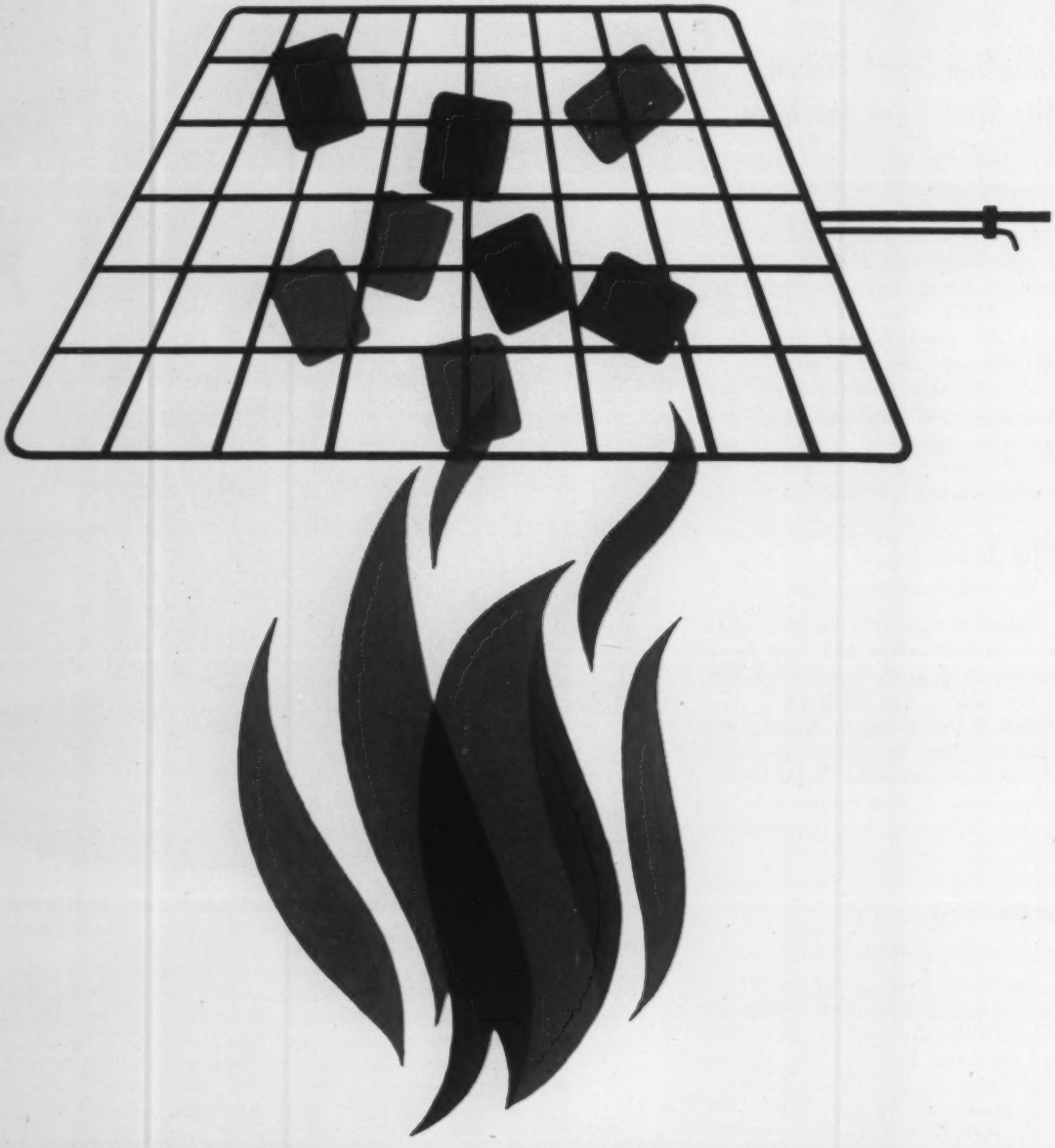

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SHERRITT GORDON MINES LIMITED

American Iron Ore Association. Shipments in the 1961 shipping season to June 1 totaled 5,450,014 tons, off 12,701,118 from the 18,151,132 tons moved up to the same date in 1960.

Structural Shapes . . .

Structural Shape Prices, Page 205

While considerable inquiry is before the market, orders for structural steel continue slack. The main support is coming from public works. Backlogs of fabricating shops vary widely.

Mill deliveries of both standard and wide flange structurals range two to four weeks, with shipments of wide flange sections tending to lengthen a little.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7700 tons, bridge superstructure, Ohio River, Covington, Ky.-Cincinnati, Ohio, Department of Highways, Kentucky, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

3750 tons, elevated highway structure, South Route Expressway and 28th Place, Chicago, to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

2245 tons, two, 7 span, welded, composite plate girder bridge, South Burlington-Winooski, Vt., 1-89-3 (10) contract 1, to American Bridge Div., U. S. Steel Corp., Pittsburgh; W. H. Hinman Inc., Westbrook, Maine, general contractor.

1420 tons, hospital, White Haven, Pa., to Weatherly Steel Co., Weatherly, Pa.

900 tons, galvanized steel towers, to Italian fabricators, by Bonneville Power Administration, Portland, Oreg.

375 tons, bridgework, Lutherville, Md., to Cumberland Bridge Co., Camp Hill, Pa.

250 tons, sheet piling, U. S. Department of Agriculture, Washington, to U. S. Steel Corp., Pittsburgh.

200 tons, galvanized steel towers, to Pacific Coast Div., Seattle, Bethlehem Steel Co.; Seattle City Light Dept. project.

STRUCTURAL STEEL PENDING

1000 tons, Red Cross Building, 57th St. and Avenue of Americas, New York; bids closed June 6.

700 tons, Princeton Club, 15-21 W. 43rd St., New York; bids asked.

550 tons, administration building, Johnson & Johnson, New Brunswick, N. J.; bids June 19.

526 tons, six, 3 span, composite wide flange beam bridges, Winooski, Vt.; J. F. Fitzgerald Construction Co., Canton, Mass., low on general contract; also, 268 tons of concrete reinforcing bars and 13,200 linear feet of steel piles.

365 tons, two span, composite plate girder bridge, Main Street, Hartford, Conn.; bids June 12, Hartford; also, 519 tons of concrete reinforcing bars and 281 tons of steel sheet piling.

324 tons, Symons Clamp & Mfg. Co., Des Plaines, Ill., to Vierling Steel Works, Chicago; Fox & Fox, Chicago, are the architects.

345 tons, five, wide flange beam bridges, Shelburne Connection, Burlington-South Burlington, Vt.; bids June 16, Montpelier, Vt.; also, 285 tons, concrete reinforcing bars and 12,670 linear feet of steel piles.

292 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia; also 217 tons of carbon sheets.

100 tons or more, radar tower, Makah Air Base, Washington State; general contract to Pacific Coast Construction Co., Lynnwood, Wash., low at $219,135.

REINFORCING BARS . . .

REINFORCING BARS PLACED

4500 tons, Philadelphia apartment, to the Bethlehem Steel Co., Bethlehem, Pa.

685 tons, two, 7 span, welded, composite plate girder bridge, South Burlington-Winooski, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; also, 4810 linear feet of steel piling to Bethlehem; W. H. Hinman Inc., Westbrook, Maine, general contractor.

175 tons, Washington State ramp structures at Longview, to unstated interest; General Construction Co., Portland, Oreg., general contractor.

100 tons, Washington State road job, Cowlitz County, to unstated interest; Lockyear & White, Longview, Wash., general contractor.

REINFORCING BARS PENDING

2000 tons or more, Metropolitan Sewage District, Seattle; bids in.

592 tons, addition to Suzzalo Library, University of Washington, Seattle; general contract to James I. Barnes Construction Co., Seattle, low at $2,441,325.

470 tons, state bridgework, Route 208 (1953) Section 2B, Bergen County, New Jersey, bids July 7.

422 tons, state bridgework, Route 287, section 3B, Middlesex County, New Jersey, bids July 6; also, 1183 tons of structural steel.

410 tons, state bridgework, Route 287, sections 12A and 13A, Morris County, New Jersey, bids July 5; also, 330 tons of structural steel.

250 tons, 642 ft Idaho state overpass, Payette County; bids to Boise, Idaho, June 13.

200 tons, first phase, Metropolitan sewage project, Seattle; General Construction Co., Seattle, apparently low at $6,181,000, for the Renton treatment plant and other units.

150 tons, 170 ft bridge and 186 ft underpass, Oregon Coast Highway; Fred H. Slate and E. C. Hall, Portland, Oreg., joint low bidders at $1,447,390, involving 9 miles of heavy road work for the Bureau of Public Roads, Portland.

120 tons, Seattle Hotel garage, Seattle; Brazier Construction Co., Seattle, general contractor.

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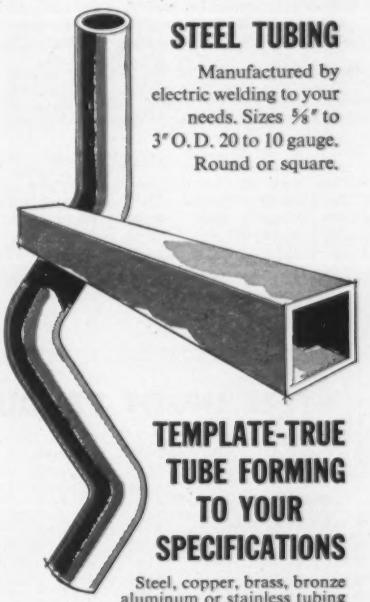

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PLATES . . .

PLATES PLACED

3000 tons, government-furnished, sheet steel piling for cofferdam, Lower Monumental project, Snake River, Washington; general bids in to the U. S. Engineer, Walla Walla, Wash.

1200 tons, 5.7 million gallon water tank, Vernon District, Portland, Oreg., to Pittsburgh-Des Moines Steel Co., Seattle, at $466,600 on rebids.

943 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to the Delaware Valley Steel Co. Inc., Upper Darby, Pa.

306 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to C. Itoh & Co. (America) Inc., New York.

217 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to Caine Steel Co., Philadelphia.

196 tons, carbon, hull, Military Industrial Supply Agency, Navy, Philadelphia, to the Southern Galvanizing Co., Baltimore.

PLATES PENDING

3500 tons, combat store ship, U. S. Navy, to National Steel & Shipbuilding Co., San Diego, Calif., at $18,130,375.

1300 tons, penstock, Yellowtail Dam, Montana; Pacific Coast Div., Seattle, Bethlehem Steel Co., reported low on subcontract.

182 tons, alloy, Military Industrial Supply Agency, Navy, Philadelphia; bids June 12; also, 60 tons of floor plates; bids June 23.

125 tons, replace 10,000 barrel jet fuel bolted storage tank, base procurement office, Williams Air Force Base, Arizona; bids June 14.

RAILS, CARS . . .

RAILROAD CARS PLACED

Kansas City Southern, 200, seventy ton steel boxcars, with 150 going to the Pullman-Standard Div., Chicago, Pullman Inc., and 50 to ACF Industries Inc., New York.

Maine Central, fifty, 50 ton pulpwood cars to Thrall Car Mfg. Co., Chicago Heights, Ill.

North American Car Corp., 129 flatcars, to Pullman-Standard Div., Chicago, Pullman Inc.

Louisville & Nashville, 590 hoppercars, to Pullman-Standard Div., Chicago, Pullman Inc., with 550, seventy ton steel hoppers to be built at Bessemer, Ala., and 40, ninety ton aluminum body covered hoppers to be built at Butler, Pa.

RAILROAD CARS PENDING

Metropolitan Transit Authority of Boston, 92 rapid transit passenger cars; bids asked.

Steel Ingot Output Dips

A SERIES of 11 weekly increases in steel ingot production was broken during the week ended June 3, and schedules called for a further decline in the week ended June 10—STEEL estimates output will be 2,030,000 tons, a drop of 22,000 tons from the tonnage recorded for the week ended June 3. But the consensus among steelmen is that output will hold up better this summer than it has in recent years.

• **Buffalo** — Operations slumped about 12 percentage points during the week ended June 10. Bethlehem Steel Co. idled five open hearth furnaces at its Lackawanna, N. Y., plant, reducing active units to 19—out of 35. The active units are the newest and largest at the plant.

• **Philadelphia**—Ingot production is easing in the Northeastern district. The index dropped 2 points to 104 (average for 1957-59 = 100) in the week ended June 3.

• **Youngstown**—Steelmaking operations held steady at 54 per cent of 1960 capacity during the week ended June 10. Republic Steel Corp. added one open hearth furnace at its local plant. The action was counteracted by the shutting down of an open hearth by Youngstown Sheet & Tube Co.

• **Chicago** — Ingot production was scheduled at 77 per cent of 1960 capacity for the week ended June 10, unchanged from the previous week.

• **Los Angeles**—The Western District operating rate for the week ended June 10 rose 0.2 per cent to an estimated 76.5 per cent of 1960 capacity. The gain was aided by an increase of 0.45 per cent by Kaiser Steel Corp.

• **Cincinnati**—Steel production rose about 2000 tons during the week ended June 10 to an estimated 90,000 tons. Operations were about 78.5 per cent of 1960 capacity.

• **Birmingham**—Steelmaking in the Southern District rose about two points to 70 per cent of 1960 capacity during the week ended June 10. Lone Star Steel Co. lighted its fifth open hearth furnace and put on more operating turns at its rolling mills. The firm is operating at 100 per cent of capacity, says E. B. Germany, president.

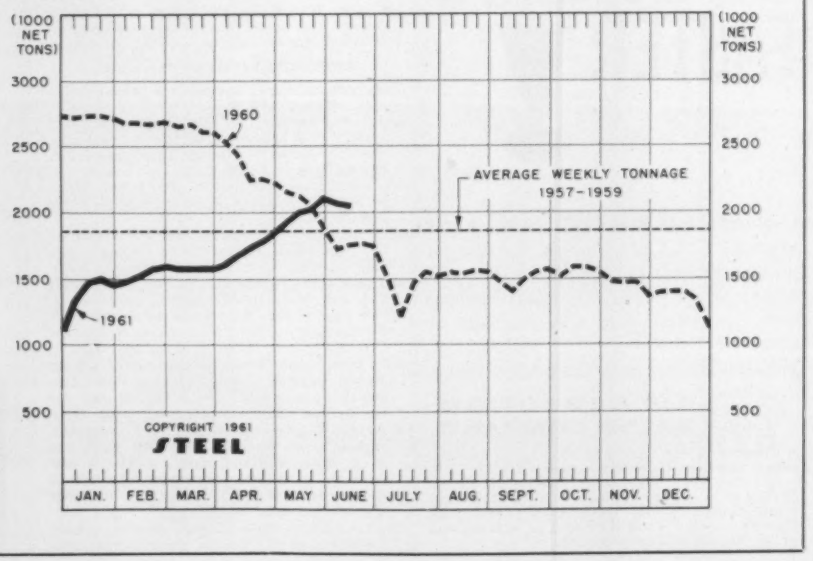
• **Cleveland**—Steel ingot production here is holding at the highest level since May, 1960.

STEEL INGOT PRODUCTION

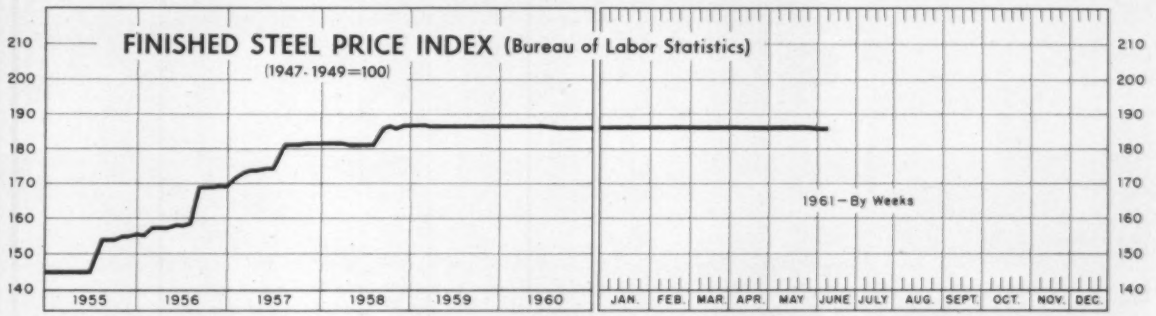
Weeks Ended	Net Tons	Change
June 10	2,030,000*	— 1.1%
June 3	2,052,000	— 1.2%
May 27	2,077,000	+ 2.0%
Totals to June 3		
1961	37,141,000	—30.7%
1960	53,606,000	

DISTRICTS	Week Ended —June 3— Tons‡	Index†	Week Ended May 27 Index†
Northeastern	277,884	104	106
Buffalo	115,879	119	120
Pittsburgh	383,372	95	98
Youngstown	176,780	104	103
Cleveland	115,744	125	122
Detroit	145,835	139	142
Chicago	430,187	115	115
Cincinnati	85,962	114	118
St. Louis	65,688	125	123
Southern	114,900	106	108
Western	139,126	119	121
Industry	2,052,000	110.1	111.5

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



June 6, 1961	Week Ago	Month Ago	May Index	Year Ago
185.6	185.6	186.1	186.1	186.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 6

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.654
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	193.040
		Casing, Oil Well, Alloy (100 ft)	302.603
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	June 7 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.98
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.27
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	38.50	37.33	36.33	31.33	46.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 7 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	June 7 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tonst†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$37.50	$35.50	$34.50	$30.50	$44.50
No. 1 Heavy Melt, E. Pa.	39.50	39.00	39.00	34.00	48.00
No. 1 Heavy Melt, Chicago	38.50	37.50	35.50	29.50	46.00
No. 1 Heavy Melt, Valley	38.50	38.50	36.50	32.50	49.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	33.50	31.50	47.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	30.50	45.50
Rails, Rerolling, Chicago	58.50	57.50	57.50	49.50	69.50
No. 1 Cast, Chicago	43.50	42.50	41.50	42.50	45.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

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Equipment by
S. BLICKMAN, INC.
Weehawken, N. J.

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There are two requirements for a top-notch food preparation area: (1) Equipment of good design that eliminates places for bacteria to collect; and (2) Equipment made of lifetime stainless steel—the smoothest, easiest to clean and most bacteria and vermin resisting material you can buy. *It's a better product if it's made of stainless!*

WASHINGTON STEEL CORPORATION

and ColorRold®

PRODUCERS OF *MicroRold®* STAINLESS SHEET & STRIP

WASHINGTON, PA.

Stainless Steel

Steel Prices

Mill prices as reported to STEEL, June 7, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 206; footnotes, page 208.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOT, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary, Ind. U5 ....122.50
S.Chicago,Ill. R2,W14..122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ...5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixvill,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Struthers,O. Y1 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 .5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N5 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1 .8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbo,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B2 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhal,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon
LosAngeles P2, S30...11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 ....9.225
Detroit H5, S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225

S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.00
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex. (26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ..7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaClay,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, ENAMELING

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped‡

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N5 Nelsen Steel & Wire Co. Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 .....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1.5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 .....5.10
S. SanFrancisco (25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 .....8.40
S. Chicago, Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 .....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1.7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 .....7.575
S. SanFrancisco (25) B3.8.325
SparrowsPoint, Md. B2 ..7.575
Warren, O. R2 .....7.575
Weirton, W.Va. W6 .....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn, Mich. S3 ...7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 .....7.425
Farrell, Pa. S3 .....7.425
Follansbee, W.Va. W10 .7.425
Fontana, Calif. K1 .....9.20
FranklinPark, Ill. T6 ...7.425
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 .....9.30
McKeesport, Pa. E10 ...7.525
NewBedford, Mass. R10.7.875
NewBritain, Conn. S15 .7.875
NewCastle, Pa. B4, M23.7.425
NewHaven, Conn. D2 ...7.875
NewKensington, Pa. A6.7.425
Pawtucket, R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale, Ill. A1 .....7.425
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ...8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 .....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W.Va. W6 .....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	... ...	18.85	22.95 27.80
Buffalo W12	... ...	18.85	....
Fostoria, O. S1	... ...	19.05	22.15 ....
FranklinPark, Ill. T6	... ...	19.20	23.30 28.15
Harrison, N.J. C18	... ...	18.85	22.95 27.80
NewYork W3	... ...	18.85	22.95 27.80
Palmer, Mass. W12	... ...	18.85	....
Trenton, N.J. R5	... ...	18.85	22.95 27.80
Worcester, Mass. A7, T6	... ...	18.85	22.95 27.80
Youngstown S41	... ...	19.20	23.30 28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.10	9.35	9.75
Fairless, Pa. U5	9.10	9.35	9.75
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless, Pa. U5	6.10	6.25	6.40	6.55
Gary, Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor, Ind. I-2	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.40	10.65
Fairless, Pa. U5	10.40	10.65
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.20
Fairless, Pa. U5 .....8.20
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
GraniteCity, Ill. G4 .....8.30
Ind. Harbor, Ind. I-2, Y1.8.20
Irvin, Pa. U5 .....8.20
Niles, O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
SparrowsPoint, Md. B2 ..8.20
Weirton, W.Va. W6 .....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 .....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ..7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 ....7.525*
Warren, O. B9, S3, T5.7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ...8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
Palmer, Mass. W12 ....8.30
Pittsburg, Calif. C11 ...8.95
Portsmouth, O. P12 ....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ...8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2 ..12.65
KansasCity, Mo. U3 ...12.90
LosAngeles (2) B3 ....13.60
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ...12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 ....12.95
SparrowsPt., Md. (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ..10.075
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ...10.70
Sparrows Pt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7, J4, T6 10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ...10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8.16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C10 ...16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 ....16.60
S. SanFrancisco C10 ...17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S41 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 ....13.75
Portsmouth, O. P12 ....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	**12.65**

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	**175**
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	**173**
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	**173**
Joliet,Ill. A7	173
KansasCity,Mo. S5	**180**
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S. Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparowsPt.,Md. B2	**9.16**
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	**9.21**
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S. Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‖
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‖
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	**193****
SparrowsPoint,Md. B2	198‖
Sterling,Ill.(7) N15	198

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	**17.85**	**19.65**
Bartonville K4	17.95	19.80
Chicago W13	17.85	...
Cleveland A7	17.85	...
Craw'sville M8	**17.95**	**19.80‡‡**
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65‖
Kan.City,Mo. S5	18.10	...
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	**19.10**	**19.70†**
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	**18.20**	**19.75****
SparrowsPt. B2	**17.95**	**19.75§**
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	...

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190‖
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

6 to 8 gage	**An'ld**	**Galv.**
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	...
Crawfordsville M8	9.10	9.80††
Donora, Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‖
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‖
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40.000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
2¾	12	62.62	73.40	55.59
3	12			

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

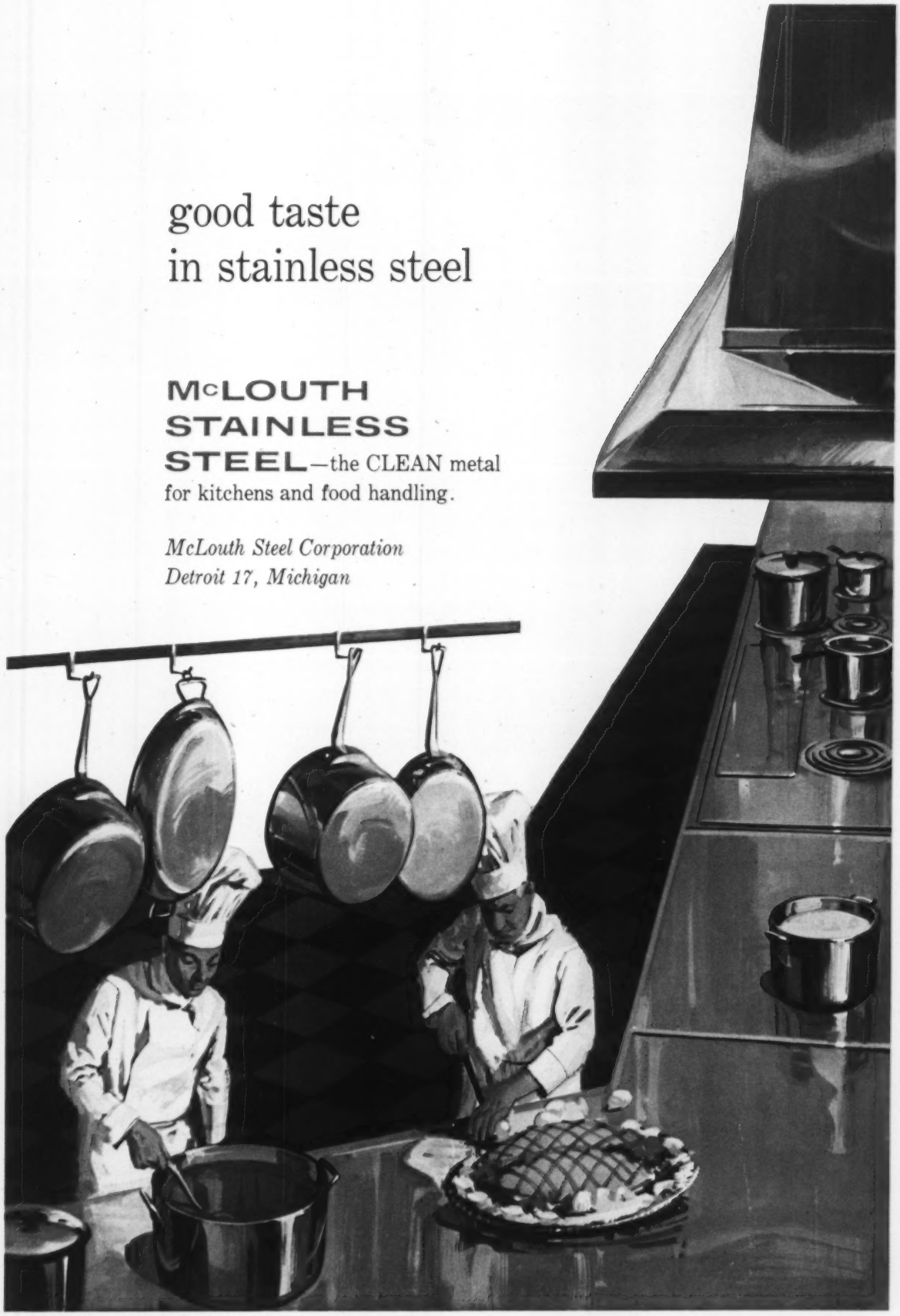
FOOTNOTES

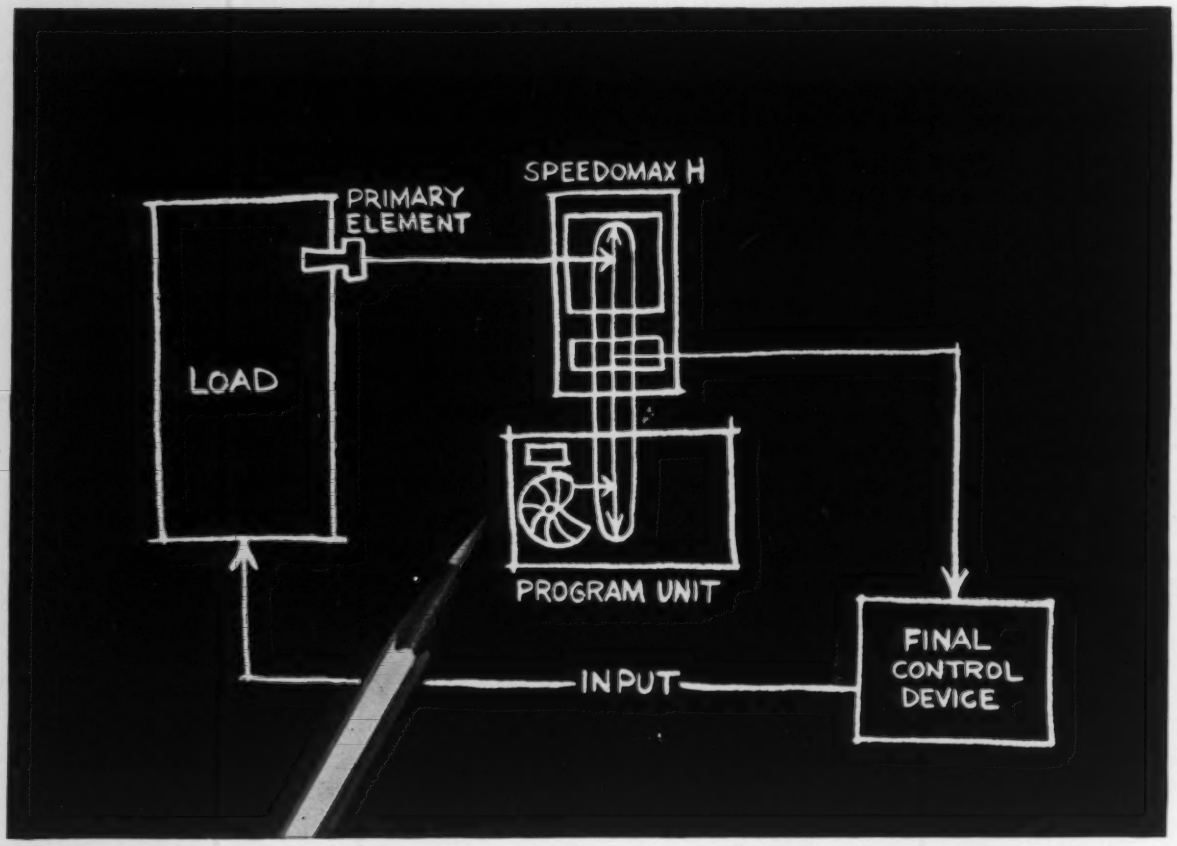
(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 3 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

good taste
in stainless steel

McLOUTH STAINLESS STEEL—the CLEAN metal for kitchens and food handling.

McLouth Steel Corporation
Detroit 17, Michigan





Reproduce your time-temperature cycles exactly with L&N cam-type program control

At the flip of a switch you can heat . . . soak . . . and cool at a preset rate for a preset time with L&N's improved cam type program control! Whether your program is linear or non-linear, this control will continuously regulate input to reproduce *your* cycle . . . again and again.

Heart of the system is the program unit. Essentially it's a motor-operated cam and a control slidewire. The cam is calibrated . . . making it extremely easy to lay out and cut to any time-temperature cycle. Changing a cam to meet a new program takes only a minute. For additional flexibility, the unit has seven standard speeds . . . permitting a multiple number of programs.

Other elements in the control system include a primary element, a Speedomax® recorder and associated control relay, and a final control device. Any change detected by the primary element and measured by the recorder is checked by the program unit, which regulates the final control device to keep the process on cycle.

Also available is a motor-operated front setter type of program control. Recommended for linear programs only, this system offers great flexibility within the range selected.

Both types are available for Two-Position or proportioning control . . . will regulate input to electric or fuel-fired furnaces.

Can your process benefit from programmed heating and cooling? If so, it'll pay you to investigate L&N program control. For more information, call your nearest L&N office, or write 4957 Stenton Ave., Philadelphia 44, Pa. Ask for Data Sheet ND46-33(4).

LEEDS Instruments NORTHRUP Automatic Controls • Furnaces

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	36.00	....	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.76
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Prooducts; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base—Cold Rolled—10%	Strip, Carbon Base—Cold Rolled—Both Sides
Copper*	36.60	43.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3 J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	11.10	11.77	12.40	10.05	13.35	16.59	10.50	9.85	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.54	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.66	11.75	12.13	9.98	12.98	16.95	10.21	10.80	13.45
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	10.17	10.98	11.35	11.73	9.58	13.10	16.55	9.81	9.90	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.20	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.80	10.00	10.89	11.25	9.65	11.95	16.48	9.85	9.60	11.10
Pittsburgh	9.22	10.66	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.85	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $1.75.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., Mexico, Mo., New Savage, Md., St. Louis, $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley,Ala., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Pa., $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Aisey, Ill., Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Pa., Wellesville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260; Troup, Tex., $265.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Troup, Tex., Philadelphia, $325.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Troup, Tex., Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon (N.T.):
Forging $97.00
Rerolling 78.00
Alloy (N.T.) 115.00

Wire Rods:
Carbon 5.70
Alloy 6.40

Wire (carload lots):
Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:
Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Bar Mill Brands:
Carbon 5.40
Alloy 8.05

Bars, Reinforcing ... 5.30

Structural Shapes:
Standard carbon ... 5.50
Angles & zees 5.40

Plates, Carbon:
Sheared 5.45
Universal mill 5.10

Sheets & Coils, Hot Rolled:
Carbon sheet 4.95
Carbon strip 5.00

Sheets & Coils, Cold Rolled:
Carbon sheet 6.35
Carbon strip:
(0.080 and lighter) 6.35
(0.081 and heavier) 6.35

Sheets & Coils, Galvanized:
Standard quality ... 6.70
Culvert quality 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
Field grade 9.00
Electrical grade 10.15

Sheet Piling 6.15
Skelp 4.70
Rails, Heavy 5.55
Rails, Light 5.70
Joint Bars 6.55
Tie Plates 6.35
Grinding Balls (3 in. diam.) 7.00
Tin Mill Products (Per base box; 100 lb base wt)
Coke tin plate (1.25 lb pot yield) $10.60
Electrolytic tin plate (0.25 lb coating). 9.10
Black plate 8.30
Nails, Wholesale:
Carload lots ....Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	*7.50*††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	*27.75*
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe..36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	*37.80*
Bronze powder, 90/10.	*55.80*
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types ...	0.78-1.06
Nickel-Silver	*54.70*
Solder	7.00*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.60	$5.65	$5.55	$5.45	$5.75
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.65	5.70	5.60	5.50	5.80
I-Beams	5.60	5.65	5.55	5.45	5.75
Channels	5.60	5.65	5.55	5.45	5.75
Plates (basic bessemer)	5.55	5.60	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.20	6.15	6.05	5.90	6.25
Merchant Bars	6.15	6.20	6.10	6.00	6.30
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (‡)	7.15	7.20	7.10	7.00	7.30

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports ...	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$15.00-15.75**
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked *$1.40*

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.50
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens..	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.75
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c. f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contatined Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.05% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c, per lb contained Si. Packed, c.l. 16.00c, ton lot 17.45c, less ton 19.10c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

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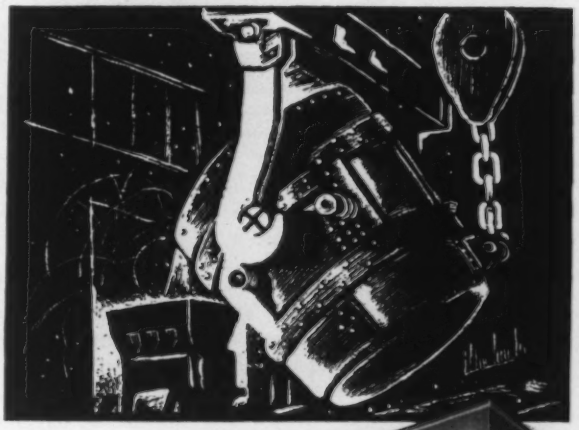

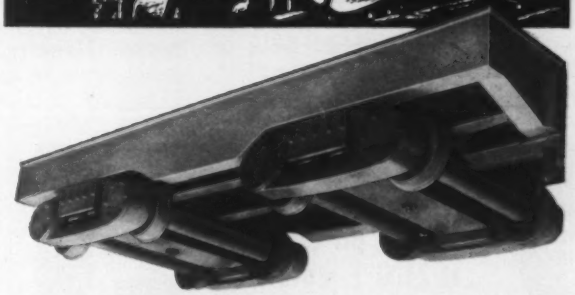

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Scrap Index Rises to Higher Level

STEEL's composite on No. 1 heavy melting grade scores a further increase of $1.17 a ton to $38.50. Third quarter export orders for 600,000 tons give support

Scrap Prices, Page 218

• **Chicago**—On the basis of new but limited mill purchases of steelmaking scrap, the market is up another $1 a ton. They put industrial No. 1 heavy melting at $39-$40, dealer No. 1 heavy melting $37-$38, and No. 2 heavy melting $31-$32. During the last two weeks the market has moved up $3 a ton.

• **Pittsburgh**—Prices on the leading steelmaking grades are up about $2 a ton on the basis of a purchase by a district mill at $37, delivered, for No. 1 heavy melting. Other steelmaking grades are up similarly. The higher prices follow increases of about $2 a ton paid recently by dealers for a district auto stamping plant's scrap, which went at $42 to $43 a ton. Railroad scrap is up about $2 on a sale for export.

• **Philadelphia** — Domestic prices are a shade higher on most open hearth grades of scrap. There is a little pickup in district mill orders, and while buying by the Japanese cartel for the third quarter (600,000 tons) is down some from the current period, supplies for export are tight.

• **New York**—While brokers' buying prices are unchanged, the tone of the market is slightly stronger. In addition to continued good movement abroad, there is some mild pickup in domestic trading.

Recent purchases of 600,000 tons in this country by the Japanese cartel for the third quarter were lighter than second quarter requirements. However, tonnage requirements could be increased later, and demands from other quarters could stiffen as time passes.

• **Boston**—Domestic buying is light, and export demand has slowed down. Foundries are buying cast iron in small lots.

• **Cleveland** — Market sentiment continues fairly strong, though buying isn't too active, and a summer dip in steelmaking operations is likely to hold down purchases. However, a major Valley mill has placed a June delivery order for No. 1 heavy melting industrial scrap at $41. That was $2.50 a ton over the last sale of that grade in the Valley.

• **Detroit** — Considerable activity developed in the market following the closing of auto lists at the start of the month. One mill took most of the auto bundles. Ford sold bundles and foundry scrap for the first time in several months. A large Canadian order (involving around 100,000 tons) is pending.

• **Buffalo**—District steel mills have

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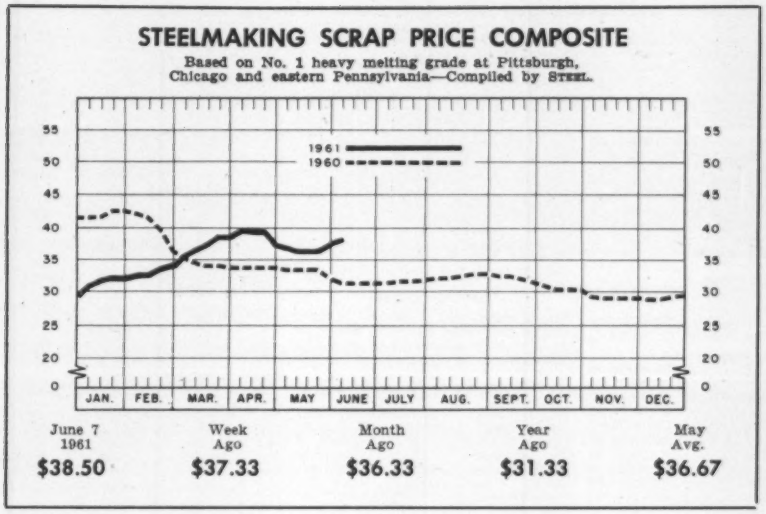


placed new orders for leading grades of scrap at prevailing prices for June delivery. The new contracts have helped to stabilize the market.

• **Cincinnati**—The market moved up $2 a ton on the principal grades following purchases by two district mills. No. 1 heavy is quoted $32-$33 by brokers.

• **St. Louis**—The market is firm, but prices are unchanged. Not much scrap is being offered, and out-of-district prices have advanced, which accounts for the stronger market tone.

• **Birmingham**—Prices are steady here, but dealers say there has been a sharp pickup in export demand.

• **Houston**—Prices are unchanged, but they don't appear too firm. Buying is light, and mill backlogs are comfortable. District exporters are paying $36 for No. 2 heavy melting compared with a domestic price of $31-$32.

• **Los Angeles**—Dealers are anticipating some mill buying for June shipment. They think orders will be placed at prices comparable to those now applying on export tonnage.

• **San Francisco**—Prices on prime steelmaking grades of scrap are up $2 a ton, largely on the basis of export sales. No. 2 heavy melting prices are up $1.

• **Seattle**—Dealers report the domestic market is holding up well, both in volume and prices. Exporters continue active in the market, scheduling both parcel and full cargo shipments.

• **Portland, Oreg.**—Exporters are busy assembling tonnage for current commitments to Japanese buyers. Full cargoes will be dispatched from here this month.

Scrapmen Claim Iron Ore Freight Rates Subnormal

Scrapmen are battling the railroads and steel mills on the subject of freight rates before the Interstate Commerce Commission. The Institute of Scrap Iron & Steel charges that rail rates on scrap unjustly discriminate in favor of competitive products, such as pig iron and iron ore.

The charge was made last week in a brief filed with the commission. Defendants are railroads, including the New York Central and Pennsylvania. Intervening on behalf of the carriers are the integrated steel companies.

The brief attacks rates in the Official Territory, pointing out the defendants have made no adjustments in them in spite of two years of appeals and negotiations. Scrap has been assessed the full impact of every *ex parte* increase since World War II, the Institute says. On the other hand, iron ore, it says, has received favorable treatment and moves on subnormal rates.

Capacability means

Convenience

When it comes to ramming refractories, *convenience* is Basic. And, it pays to let Basic's magnesia ramming refractories, RAMSET and RAMICLASE, be your "ace in the hole" when schedules are tight. For quick, dependable bottom installations, they can't be beat.

In the 20 years since their introduction, RAMSET and RAMICLASE have become the standard of comparison for open hearth and electric furnace bottoms. For the best possible job, Basic furnishes special mixers, conveyors, rammers and other equipment to speed installation and reduce labor costs.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, June 7, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 7	$38.50
May 31	37.33
May Avg.	36.67
June 1960	31.33
June 1956	46.04

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*37.00-38.00*
No. 1 factory bundles	*42.00-43.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	16.00-17.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	*40.00-41.00*
3 ft and under	37.00-38.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	41.00-42.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*36.00-37.00*
Stove plate	35.00-36.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt	*39.00-40.00*
Rails, 2 ft and under	*50.00-51.00*
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	*42.00-43.00*
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	*85.00-90.00*
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy. melt., indus	*39.00-40.00*
No. 1 hvy. melt., dealer	*37.00-38.00*
No. 2 hvy. melting	*31.00-32.00*
No. 1 factory bundles	42.00-43.00
No. 1 dealer bundles	*38.00-39.00*
No. 2 bundles	23.00-24.00
No. 1 busheling, indus.	*39.00-40.00*
No. 1 busheling, dealer	*37.00-38.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	*42.00-43.00*
Punchings & plate scrap	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Stove plate	*38.00-39.00*
Unstripped motor blocks	*35.00-36.00*
Clean auto cast	*48.00-49.00*
Drop broken machinery	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
R.R. malleable	*47.00-48.00*
Rails, 2 ft and under	*49.00-50.00*
Rails, 18 in. and under	*50.00-51.00*
Angles, splice bars	44.00-45.00
Axles	*58.00-59.00*
Rails, rerolling	*58.00-59.00*

Stainless Steel Scrap

18-8 bundles, solids	*185.00-190.00*
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55 00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	61.00-62.00
Railroad specialties	41.00-42.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	39.00-40.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	39.00-40.00
Low phos. punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	*41.00-42.00*
No. 1 railroad cast	48.00-49.00
Railroad specialties	*43.00-44.00*
Angles, splice bars	46.00-47.00
Rails, rerolling	*55.00-56.00*

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	75.00-80.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	38.00-39.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*28.50-29.50*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 18 in. and under	*47.00-48.00*
Rails, random lengths	*41.00-42.00*

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	42.00
No. 2 bundles	*25.00-26.00*
No. 1 busheling	41.00-42.00
Electric furnace bundles	43.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	52.00-54.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*10.00-11.00*
Mixed borings, turnings	*11.00-12.00*
Shovel turnings	*12.00-13.00*

Cast Iron Grades

No. 1 cupola	*32.00-33.00*
Mixed cast	*30.00-31.00*
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	*39.00-40.00*

Stainless Steel Scrap

18-8 bundles & solids	*170.00-175.00*
18-8 turnings	*70.00-75.00*
430 bundles & solids	*70.00-75.00*
430 turnings	15.00-20.00†

BIRMINGHAM

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	19.00-20.00
No. 1 busheling	*38.00-39.00*
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	21.00-22.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	*38.00-39.00*
Electric furnace:	
3 ft and under	*36.00-37.00*
2 ft and under	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	40.50-41.50
Angles, splice bars	42.00-43.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	40.00
2 ft and under	44.00-45.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	43.00

LOS ANGELES

No. 1 heavy melting	38.00-40.00
No. 1 hvy melt (export)	40.00-42.00
No. 2 heavy melting	34.00-37.00
No. 2 hvy melt (export)	37.00-39.00
No. 1 bundles	39.00
No. 2 bundles	25.00
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	50.00-52.00

Cast Iron Grades

No. 1 cupola	44.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	41.00-42.00
No .2 heavy melting	38.00
No. 2 bundles	27.00
Shovel turnings	16.00-18.00
Electric furnace	46.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	37.00
Unstripped motor blocks	36.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	*44.00-45.00*
No. 1 hvy (unprepared)	*39.00*
No. 2 heavy melting	*41.00-42.00*
No. 2 hvy (unprepared)	*36.00*
No. 2 bundles	*31.00*
Shovel turnings	16.00
Electric furnace	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	44.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	*37.00*

SAN FRANCISCO

No. 1 heavy melting	*43.00***
No. 2 heavy melting	*39.00***
No. 1 bundles	34.00**
No. 2 bundles	27.00**
Machine shop turnings	18.00**
Mixed borings, turnings	18.00**
Cast iron borings	18.00**
Heavy turnings	18.00**
Shovel turnings	18.00**

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Broker's buying prices; net tons)

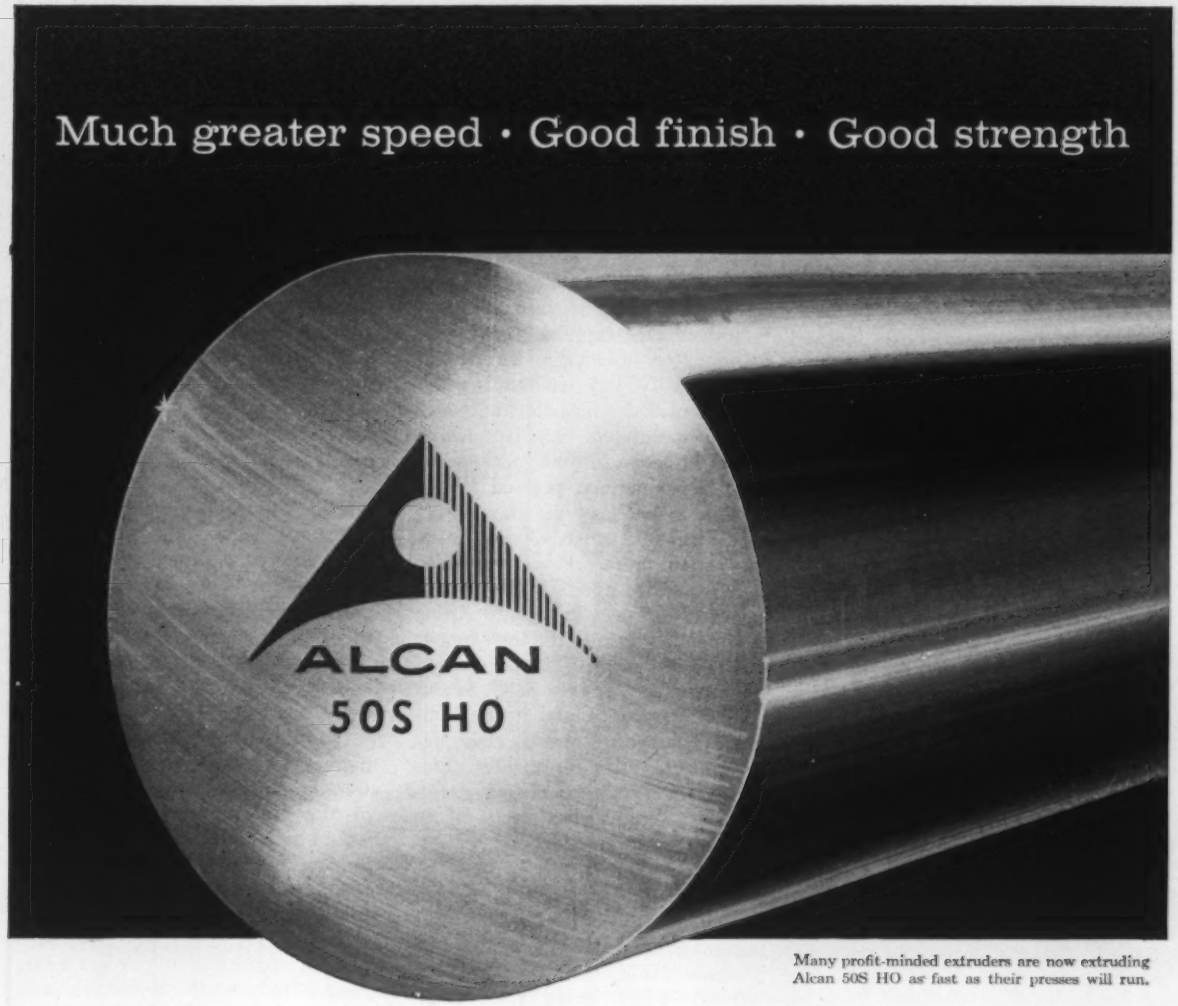
No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

Much greater speed • Good finish • Good strength



Many profit-minded extruders are now extruding Alcan 50S HO as fast as their presses will run.

Here in one aluminum ingot...

much greater extrusion speed... plus good finish and strength

WHEN you run Alcan 50S HO you get greater production . . . per day and per machine-hour . . . while still maintaining good mechanical properties and finish.

That sums up the experience of many fabricators now using this much-improved version of the long-time favorite Alcan 50S. They're unanimously enthused about its increased press speed . . . *up to maximum press capacity.*

Because of the all-around performance of Alcan 50S HO, there is no longer any necessity for stocking a large variety of ingot products. This one ingot takes care of the majority of product runs. Alcan 50S HO Ingot can reduce your inventory as much as 60%.

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ALCAN

Market Quieter — But for How Long?

Nonferrous Metal Prices, Pages 222 & 223

THE PULSE of the copper and tin markets is beating a little more slowly these days after weeks of feverish activity. Metalmen, long accustomed to the volatile nature of both metal markets, admit that the activity has been about as hectic as any in recent memory.

• **All for Now**—The feeling is growing in copper circles that the present price upswing has about run its course. Only a few weeks ago, all of the indicators seemed to point to a copper price in the U. S. near 32 or 33 cents a pound. And some metalmen were quietly predicting 34 or 35 cents a pound.

Tin is more of a question mark. Some of the pressures on the price seem to have eased a bit. But few tinmen want to go out on the limb with predictions either that this signifies the end of the price spiral or that a resting period has been reached with more upward action ahead.

• **Short Fuses** — The situation in both metals remains potentially explosive. Remember that the price upswings in both copper and tin were as much psychological as physical. And the two have common denominators that sparked the rises:

• Both have enjoyed rising demand. New orders may have eased a bit recently, but demand is good.

• Fears of a shortage spurred widespread speculative activity which added impetus to the upswing in prices. Coppermen pointed to the continuing violence in the Congo which threatened to disrupt mine production there. Fears were also expressed that the Congo turmoil and the trouble in South Africa might spill over into the lush copper fields of Northern Rhodesia. Possibilities of strikes exist at U. S. and Chilean properties later in the summer. The specter of a shortage has also affected the tin market. Production in the Congo ceased in December. Output has been off in Bolivia and Indonesia.

• **Copper Outlook** — The copper market looks stable for the time being. Producers see a modest improvement in demand over the year, but no spurt. Scrap prices have eased, although exports are still holding at high levels, taking some of the pressure off custom smelters. The market is still sensitive to change—actual or anticipated. A strike, a runup in scrap prices (which seems unlikely now), or some political disorder could bring fast price activity, particularly in custom smelter copper. Whether any of the producers would balk at a further rise in the primary price remains to be seen.

• **Tin Outlook**—The tin market is still topsy turvy, but we seem to have entered a period of watching and waiting. As STEEL went to press, the price was $1.11 a pound, the highest it has been since the Suez Canal crisis of 1956. Sales are a little quieter and speculative activity has eased.

No one knows what direction the market will take next. Metalmen were hoping that the recent meeting of the International Tin Council would help clarify the situation. But judging by the vagueness of the communique released by the council, it too is confused.

You still hear fears of tight supply later in the year. Congo mines remain closed. Troubles evidently continue to plague Indonesian and Bolivian tin operations. On the plus side, Malaya can be expected to turn out more metal this year.

What the U. S. will do with the 4000 tons of tin in storage at Texas City, Tex., is up in the air. Just a few weeks ago, the trade expected an early announcement that this metal would be put on the market. Disposal is reportedly being held up by conflict among government departments as to what effect this might have on certain underdeveloped nations.

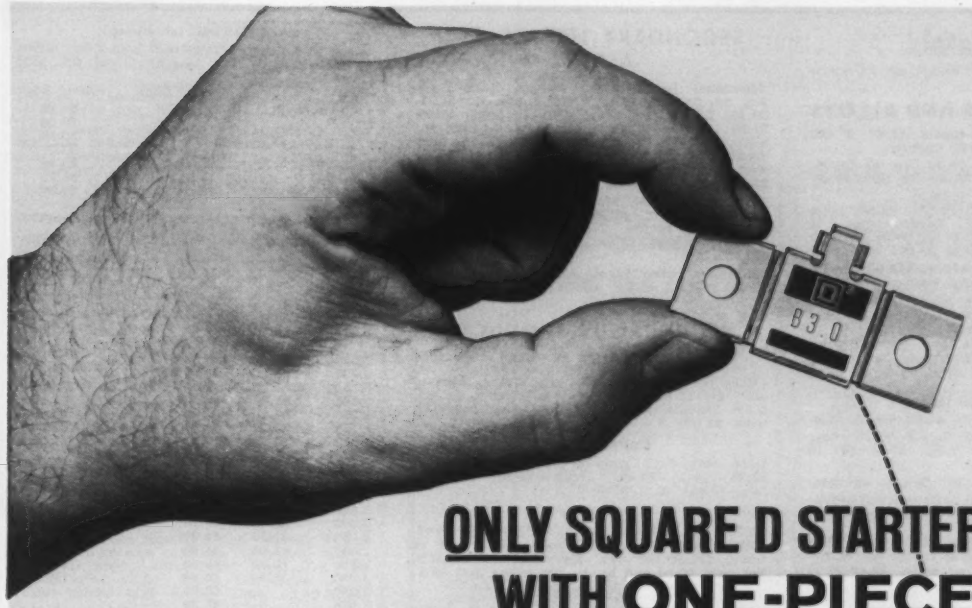
The International Tin Council holds a little less than 10,000 tons of metal which it must begin to sell when the London price reaches $1.10 a pound (it's slightly under that figure now). The ITC stock, plus the possibility that both U. S. and Canadian governments will release tin to the market, should go a long way toward keeping the price in check.

Where Aluminum Went in First Quarter

(Percentage breakdown of shipments*)

Building Products	18.6	Shipments for Conversion Into Wrought Products	9.0
Transportation	18.0	Machinery & Equipment (except electrical)	4.3
Distributors & Jobbers	14.1	Exports	1.0
Consumer Durable Goods	12.6	All Others & Unidentified	3.3
Electrical	9.6		
Containers & Packaging	9.5		

*Covers shipments of all wrought products and permanent mold and sand castings.
Source: Aluminum Association.



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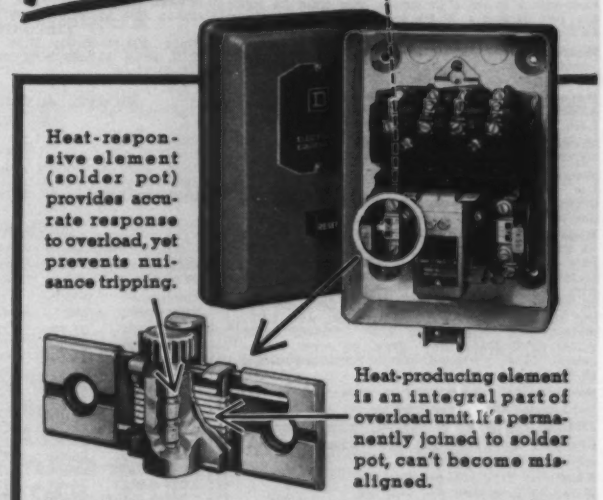
• Only Square D makes thermal overload relays with 1-piece construction—and only with 1-piece construction can you *know* you've installed the heater correctly. Square D 1-piece overload relays can be installed only one way. They are factory-assembled, individually tested and calibrated, completely tamper-proof. Repeated tripping will not affect accuracy.

You *pay* for overload protection—be sure you *get* it. Insist on Square D 1-piece overload relays for *absolute* protection.



Heat-responsive element (solder pot) provides accurate response to overload, yet prevents nuisance tripping.

Heat-producing element is an integral part of overload unit. It's permanently joined to solder pot, can't become misaligned.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $203-205 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb. f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4-x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $80 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 112.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Die casting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max., 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.00-25.50; No. 2 heavy copper and wire, 23.25-23.75; light copper, 20.75-21.25; No. 1 composition red brass, 21.50-22.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.625
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.50-21.00; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.50-19.00; brass pipe, 19.00-19.50.

Lead: Soft scrap lead, 7.25-7.75; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00, turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.50-4.00; new diecast scrap, 3.50-4.00; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.75-12.25; segregated high copper clips, 10.75-11.25; mixed low copper clips, 11.25-11.75; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00; segregated high copper clips, 13.50; mixed low copper clips, 13.50; mixed high copper clips, 13.00-13.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 26.75; light copper, 24.50; refinery brass (60% copper) dry copper content, 25.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 26.75; light copper, 24.50; No. 1 composition borings, 24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 19.00; yellow brass turnings, 17.00; radiators, 20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.
Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 109.00; 500-1999 lb, 102.00; 2000-4999 lb, 98.50; 5000-29,999 lb, 97.50; 30,000 lb, 96.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 500 lb, 141.00; 500-999 lb, 139.00; 1000-1999 lb, 137.00; 2000-9999 lb, 136.00; 10,000-19,900 lb, 135.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadimum Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 84.20; 100-600 lb, 74.50; 700-1900 lb, 71.80; 2000-9900 lb, 69.90; 10,000 lb or more, 68.60.

Stannous Chloride (Anhydrous): 100 lb, 141.70; 400 lb, 131.70; 800-19,900 lb, 110.40; 20,000 lb or more, 106.20.

Stannous Sulphate: Less than 50 lb, 149.40; 50 lb, 119.40; 100-1900 lb, 117.40; 2000 lb or more, 115.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

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Advertising Index

Aetna-Standard Division, Blaw-Knox Co. ..... Inside Front Cover
Air Reduction Sales Co., A Division of Air Reduction Co., Inc. 201
Allegheny Ludlum Steel Corporation 84
Allen-Bradley Co. 104
Allis-Chalmers 34
Aluminium Limited Sales, Inc. 219
Aluminum Company of America 55, 56
American Air Filter Co., Inc. 64
American Brake Shoe Co., Denison Engineering Division 162, 163
American Gas Association 72
American Pulverizer Co. 190
American Sealants Co. 4
Amplex Division, Chrysler Corporation 48, 49
Anaconda American Brass Co. 194
Anaconda Wire & Cable Co. 226
Armco Steel Corporation, Armco Division 2, 3
Armstrong-Blum Manufacturing Co. 125
Associated Spring Corporation 147
Atlantic Refining Co., The 119
Automotive Gear Division, Eaton Manufacturing Co. 99

Babcock & Wilcox Co., The, Refractories Division 150, 151
Barnes Drill Co. 21
Barnes, Wallace, Co., Ltd., Subsidiary of Associated Spring Corporation 147
Barnes, Wallace, Division, Associated Spring Corporation 147
Barnes, Wallace, Steel Division, Associated Spring Corporation 147
Basic, Inc. 115, 121, 153, 161, 217, 225
Basic Products Corporation, Hevi-Duty Electric Co. Division 24
Bethlehem Steel Co. 1
B-G-R Division, Associated Spring Corporation 147
Blaw-Knox Co., Aetna-Standard Division ..... Inside Front Cover

Carborundum Co., The 46, 47
Chicago Tramrail Division, Conco Engineering Works, Inc. 70
Chisholm-Moore Hoist Division 170
Chrysler Corporation, Amplex Division 48, 49
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 93
Colorado Fuel & Iron Corporation, The 71, 188, 189
Columbia-Geneva Steel Division, United States Steel Corporation 40, 41
Conco Engineering Works, Inc., Chicago Tramrail Division 70
Cooper-Bessemer 120
Cutler-Hammer, Inc. 12, 13

Deming Co., The 215
Dempster Brothers, Inc. 196
Denison Engineering Division, American Brake Shoe Co. 162, 163
De Vilbiss Co., The 178
Diamond Manufacturing Co. 198
Dravo Corporation 32, 33
Drop Forging Association 7
Duff-Norton Co. 175
Dunbar Brothers Division, Associated Spring Corporation 147
Dynamatic Division, Eaton Manufacturing Co. 166

Eaton Manufacturing Co., Automotive Gear Division 99
Eaton Manufacturing Co., Dynamatic Division 166
Electric Equipment Co. 223
Erie Foundry Co. 54

Foote Mineral Co. 200
Formed Tubes, Inc. 201

Frasse, Peter A., & Co., Inc. 79
Fried Steel Equipment Mfg. Corporation 6

Garlock, Inc. 31
Gear Specialties, Inc. 122, 123
General Electric Co. 52, 53
General Electric Co., Metallurgical Products Department 25, 26, 27, 28, 29
Gibson Division, Associated Spring Corporation 147
Gisholt Machine Co. 39
GPE Controls, Inc. 114
Great Lakes Screw Corporation 113

Harnischfeger Corporation 77, 78
Harris Foundry & Machine Co. 192
Hevi-Duty Electric Co., A Division of Basic Products Corporation 24
Hill Acme Co., The 184
Hitchiner Manufacturing Co., Inc. 107
Hooker Chemical Corporation 57
Hubbell, Harvey, Inc. 106

Industrial Plants Corporation 215
Ingersoll-Rand 11
International Clay Machinery, Inc. 215
International Nickel Co., Inc., The 80
International Packings Corporation 100

Jomac, Inc. 224
Jones & Lamson Machine Co. ..... 127 thru 138
Joy Manufacturing Co. 94

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division .. 180
Kaiser Steel Corporation 223
Kanthal Corporation, The 216
Kinnear Mfg. Co., The 126

Lamb, F. Jos., Co. 103
Landis Machine Co. 14, 15
Leeds & Northrup Co. 210
Lennox Tool & Machine Builders 216
Levinson Steel Co., The 156
Lindberg Engineering Co., Salt Bath Furnace Division 185
Linde Co., Division of Union Carbide Corporation 50, 51
Lukens Steel Co. 74, 75

McLouth Steel Corporation 209

Manross, F. N., & Sons Division, Associated Spring Corporation 147
Mesta Machine Co. 149
Metallurgical Products Department, General Electric Co. 25, 26, 27, 28, 29
Micrometrical Manufacturing Co. 73
Miller Co., The, Rolling Mill Division 10
Milwaukee Division, Associated Spring Corporation 147
Mine Safety Appliances Co. 58, 59
Minnesota Mining & Manufacturing Co., Adhesives, Coatings & Sealers Division ... 60
Morgan Construction Co. 116, 117
Morse Chain Co., A Borg-Warner Industry 179, 181, 183
Morse Twist Drill & Machine Co., A Division of Van Norman Industries, Inc. 171

National Acme Co., The 44, 45
National Metal Abrasive Co. 197
National Steel Corporation 22, 23
National Tube Division, United States Steel Corporation 40, 41
Norton Co. 155

Ohio Division, Associated Spring Corporation 147

Pittsburgh Steel Co., Thomas Strip Division 35, 36, 37, 38

Ransburg Electro-Coating Corporation 199
Raymond Manufacturing Division, Associated Spring Corporation 147
Reliance Electric & Engineering Co. 82, 83
Republic Steel Corporation 8, 9
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 71
Ryerson, Joseph T., & Son, Inc. 16

Sandusky Foundry & Machine Co. 174
Selas Corporation of America 176, 177
Sherritt Gordon Mines, Ltd. 200
Signode Steel Strapping Co. 108
Simonds Abrasive Co., Division of Simonds Saw & Steel Co. 182
Simonds Saw & Steel Co. 111
Simoniz Industrial Products, A Division of Simoniz Co. 76
Smith, A. O., Corporation, Welding Products Division 68, 69
Snap-On Tools 172
Square D Co. 221
Sun Oil Co. 191

Taft-Peirce Manufacturing Co. 157
Texaco, Inc. 65
Thomas Machine Manufacturing Co. 198
Thomas Strip Division, Pittsburgh Steel Co. 35, 36, 37, 38
Thompson Wire Co. 173
Timken Roller Bearing Co., The ..... Back Cover
Tinnerman Products, Inc. 152
Townsend Co., Engineered Fasteners Division 124

Udylite Corporation, The 168
Union Carbide Corporation, Linde Division .. 50, 51
United States Graphite Co., The, Division of The Wickes Corporation 42, 43
United States Steel Corporation, Subsidiaries 40, 41, 61, 62, 63, 158, 159
United States Steel Export Co. 40, 41
United States Steel Supply Division, United States Steel Corporation 158, 159
Universal Machinery and Equipment Co. 223
Urick Foundry Co. 118

Van Norman Industries, Inc., Morse Twist Drill & Machine Co. Division 171

Washburn Wire Co. 66
Washington Steel Corporation 204
Wean Engineering Co., Inc., The ..... Inside Back Cover
Whiting Corporation 186
Wickes Corporation, The, The United States Graphite Co. Division 42, 43
Wiedemann Machine Co. 67

Youngstown Foundry & Machine Co., The .. 187

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Table of Contents, Page 19

Classified Advertising, Page 223

Capacability means

Savings

When it comes to gun refractories, *saving* is Basic. You can "sock away" time and money with Basic's BRI GUN and gun refractories such as GUNDOL and GUNMIX . . . keys to easier, faster, less costly furnace maintenance.

Electric furnace operators report that GUNDOL, GUNMIX and GUNMAG for routine maintenance of sidewalls doubles lining life and, in many cases, cuts refractory costs in half. Shooting open hearth frontwalls, backwalls and skewbacks with GUNCHROME-M produces similar savings.

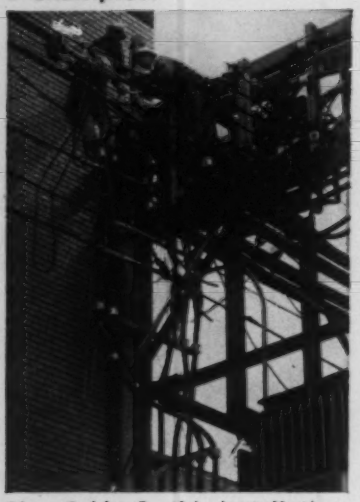
If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

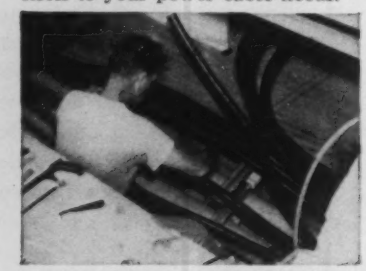
845 HANNA BUILDING
CLEVELAND 15, OHIO

NAME YOUR CABLE PROBLEM— THERE'S A GOOD CHANCE DURASHEATH CAN SOLVE IT.

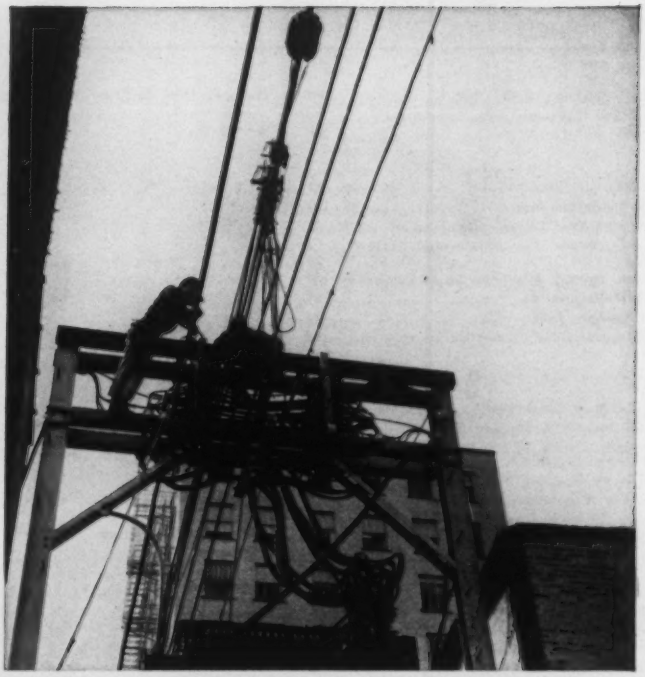
—versatile rubber-insulated neoprene-jacketed power cable that facilitates circuit installation whenever—wherever needed—fast, easily, at low cost. Here are 5 examples.



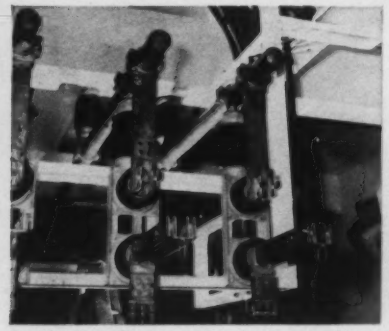
Riser Cable. In this installation, Durasheath not only serves as an aerial cable, but also as a riser cable running down the side of the building. Without additional terminations, it then drops down-inside to the plants' power-control center. It's another example of the way versatile Anaconda Durasheath adapts itself to your power cable needs.



Installed in ducts. Durasheath's flexibility meant quick and easy installation here. And once installed, its tough neoprene jacket assures long, trouble-free life. Because Durasheath adapts itself to so many uses, your inventory problems are lessened—fewer cables need be carried in stock.



Field or factory-assembled aerial cable. Durasheath may be factory pre-assembled with standard or reverse lay. Or it can be quickly field assembled with the simple spinning operation shown here. Either way, easy splicing, tapping, and terminating result in simplified installation. No cross arms or insulators are needed.



Inside installation. Here's an application where Durasheath was quickly installed and easily terminated. Durasheath's Neoprene jacket resists abrasion, heat and fumes. *Assures dependable performance and long-range economy.*

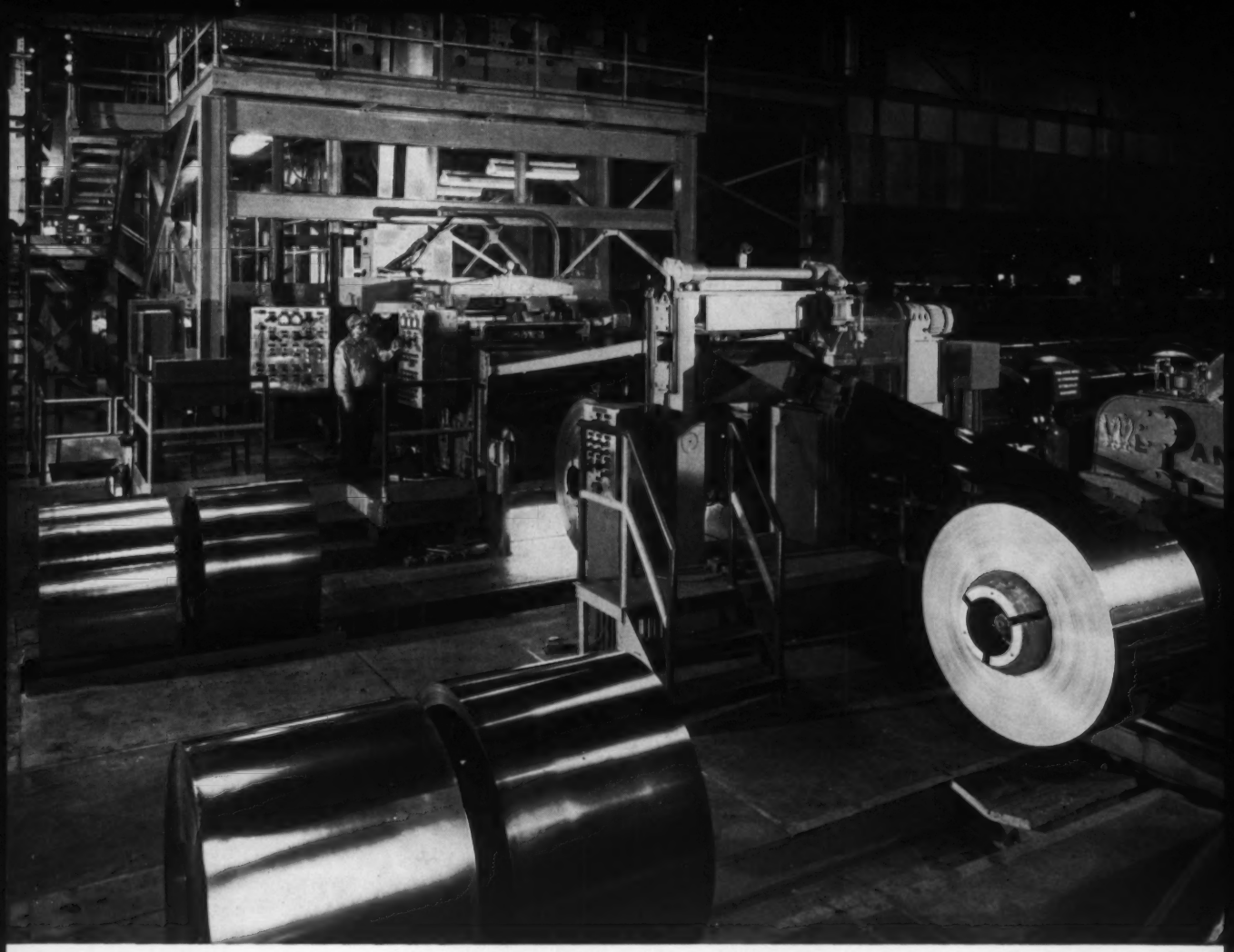
Direct-burial cable. The moisture-, oil-, and acid-resistance of Durasheath's jacket makes it the ideal cable for direct-in-the-ground applications like the one shown above. Its flexibility cuts installation time and cost because Durasheath is easy to handle. Its durability cuts maintenance costs.

ANACONDA DURASHEATH ALL-PURPOSE POWER CABLE is available in all sizes, single and multiple conductor, copper or aluminum, 600 to 35,000 volts. *Insulations:* Type RHW, Anaconda ANW, AHW, or AB butyl rubber compounds; each designed for specific purposes. *Jacket:* specially compounded neoprene with high resistance to flame, oil, acids, alkalies, sunlight, and ozone. Has high tensile strength and is flexible over a wide range of temperatures.

For complete information about Anaconda Durasheath contact Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York, Department EFL-1-S.

61358-P

ASK THE MAN FROM
ANACONDA®
FOR DURASHEATH ALL-PURPOSE POWER CABLE



Columbia-Geneva Steel increases tin plate production with third Wean Electrolytic Tinning Line

A third Wean Electrolytic Tinning Line was installed recently by Columbia-Geneva Steel Division of United States Steel Corporation to meet the growing demand for high-quality tin plate on the West Coast. This high-speed "Ferrostan" line incorporates the most modern engineering advances in design and construction of continuous processing lines.

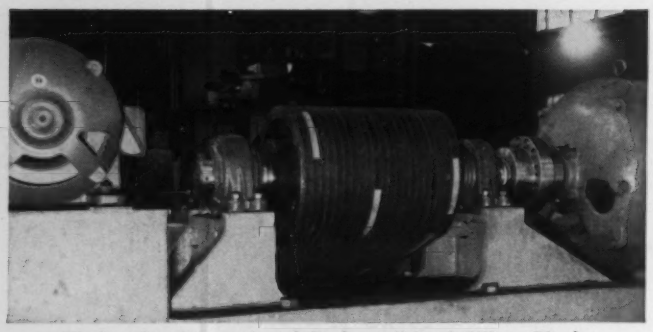
This modern line is among the first to employ an electronic data-logging system to provide a "process profile" of all coiled tin plate. Other new features include improved conductor roll mountings for more rigid support, easily replaced cartridge seals for submerged rolls, and air cylinder-controlled hold-down rolls for faster, more convenient adjustment.

Exit end equipment provides for both recoiling and shearing. A pay-off reel is included to permit shearing and classification of finished coils while the strip being processed is recoiled.

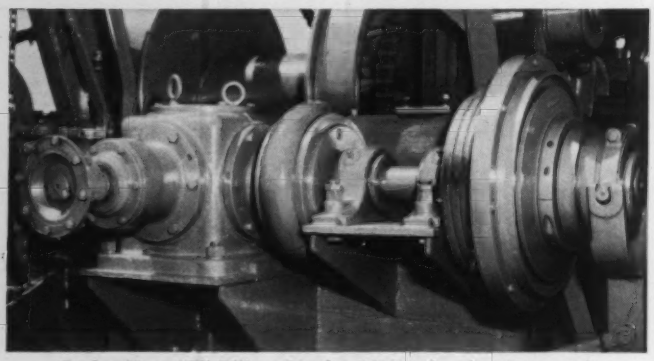
Fifty-one of the world's electrolytic tinning lines carry the Wean name and process over 80% of all electrolytic tin plate produced today. Wean's pioneer experience in continuous processing line equipment has served every major steel firm during the past thirty years. Wean's experience and "creative engineering" stand ready to serve you.

WEAN

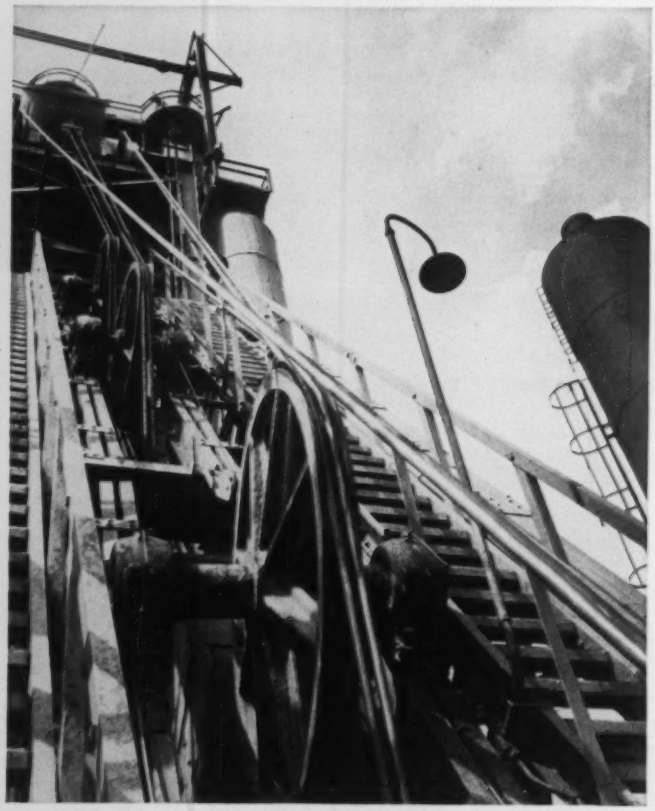
THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO



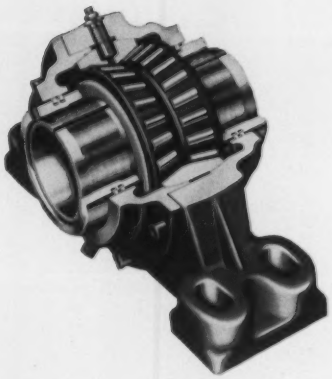
Timken bearing equipped Dodge All-Steel Pillow Blocks used on steel mill hot saw.



Dodge Type "E" Pillow Block with Timken bearings used on drive hookup of a rotary table.



Dodge 7″ Special Duty Pillow Blocks with Timken bearings used on skip hoist bull wheel at a steel mill.



From steel mills to oil wells . . .

DODGE PILLOW BLOCKS WITH TIMKEN® BEARINGS BOOST LIFE, CUT MAINTENANCE

Pictured here are three of the wide range of applications where Timken® bearing equipped Dodge Pillow Blocks handle tough jobs with minimum attention. They last longer, cut maintenance because: 1) Timken bearings are tapered to take *any* combination of radial and thrust loads. 2) They have smaller radial running clearances than axial internal clearances, providing more effective sealing, holding shafts on center for extra precision. And, 3) Timken double-row bearings are designed to permit positive lubrication. New grease can be added directly to the center of the bearing and seal. It forces out old grease, lengthens bearing life, cuts maintenance.

The cutaway view shows Timken bearings in the Dodge All-Steel Pillow Block. The specially designed bearing has a tapered bore with self-aligning spherical outer surface—never needs adjustment.

Timken bearing equipped Dodge Pillow Blocks include the All-Steel, Special Duty, Type "C", Double-Interlock and Type "E"—cover every engineering need. And with Timken bearings, space consuming thrust devices are not needed. For your No. 1 bearing value, specify "Timken".

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

Industry rolls on

TIMKEN®

tapered roller bearings